

## Syllinae (Polychaeta: Syllidae) from Australia. Part 1. Genera *Branchiosyllis*, *Eurysyllis*, *Karroonsyllis*, *Parasphaerosyllis*, *Plakosyllis*, *Rhopalosyllis*, *Tetrapalpia* n.gen., and *Xenosyllis*

GUILLERMO SAN MARTÍN\*<sup>1</sup>, PAT HUTCHINGS<sup>2</sup> AND MARÍA TERESA AGUADO<sup>1</sup>

<sup>1</sup> Departamento de Biología (Zoología), Laboratorio de Biología Marina e Invertebrados,  
Facultad de Ciencias, Universidad Autónoma de Madrid, Canto Blanco, 28049 Madrid, Spain  
guillermo.sanmartin@uam.es · maite.aguado@uam.es

<sup>2</sup> Aquatic Zoology, Australian Museum, 6 College Street, Sydney NSW 2010, Australia  
pat.hutchings@austmus.gov.au

**ABSTRACT.** Large collections of Syllidae (Polychaeta) from around Australia, housed at the Australian Museum (Sydney), have been examined and identified. Australian material from the Hamburgische Zoologische Museum der Universität, Hamburg, Germany was also examined, as well as some specimens lodged in other museums. All known Australian species of the subfamily Syllinae (Syllidae) belonging to the genera *Branchiosyllis* Ehlers, 1887 (9 species); *Eurysyllis* Ehlers, 1864 (1 species); *Karroonsyllis* San Martín & López, 2003 (1 species); *Parasphaerosyllis* Monro, 1937 (1 species); *Plakosyllis* Hartmann-Schröder, 1956 (1 species); *Rhopalosyllis* Augener, 1913 (1 species), *Tetrapalpia* n.gen. (1 species), and *Xenosyllis* Marion & Bobretzky, 1875 (2 species), are described and figured. Some were examined using the Scanning Electron Microscope to illustrate characters and methods of reproduction in this subfamily. Since there are numerous genera and species of Syllinae, the results will be presented in a series of several papers treating different genera. Keys to genera of Australian Syllinae will be provided in the final paper. Keys to species level are provided for genera having more than one Australian representative. Six new species are described: *Branchiosyllis baringabooreen*, *B. orbiniiformis*, *B. carmenroldanae*, *B. thylacine*, *Xenosyllis moloch*, and *X. scabroides*. A new genus, *Tetrapalpia* is described for the species *Opisthosyllis dorsoaciculata*. The genus *Xenosyllis* is described for the first time from Australia, as well as *Branchiosyllis oculata* Ehlers, 1887, and *B. maculata* (Imajima, 1966). A discussion of the reproduction and systematics of the subfamily is given.

SAN MARTÍN, GUILLERMO, PAT HUTCHINGS & MARÍA TERESA AGUADO, 2008. Syllinae (Polychaeta: Syllidae) from Australia. Part 1. Genera *Branchiosyllis*, *Eurysyllis*, *Karroonsyllis*, *Parasphaerosyllis*, *Plakosyllis*, *Rhopalosyllis*, *Tetrapalpia* n.gen., and *Xenosyllis*. *Records of the Australian Museum* 60(2): 119–160.

This is the third monograph contributing to our study of the Australian Syllidae, based on the large collections housed in the Australian Museum from all around Australia, but primarily from Western Australia and New South Wales, and

revision of material collected and described by Hartmann-Schröder in her series of papers on Australian polychaetes (1979–1991). This paper also summarizes published material of San Martín (2002, 2005), San Martín & López (2003), San

\* author for correspondence

Martín & Hutchings (2006), and San Martín *et al.* (2007). A general introduction to the family Syllidae in Australian waters is given by San Martín (2005) in his revision of the subfamily Exogoninae. In this paper, all species belonging to the Syllinae genera *Branchiosyllis*, *Eurysyllis*, *Karroonsyllis*, *Parasphaerosyllis*, *Plakosyllis*, *Rhopalosyllis*, *Tetrapalpia* n.gen., and *Xenosyllis*, are described and figured, and keys to species are provided. Comments are given on those genera of Syllinae not treated in this paper. Subsequent papers will deal with other genera of Syllinae and Autolytinae.

The subfamily Syllinae is attributed to Grube (1850), who erected the family Syllidae. Langerhans (1879), used the term Tribe Syllideae, for the genera *Syllis* Lamarck, 1818; *Opisthosyllis* Langerhans, 1879; *Pronosyllis* (sic for *Pionosyllis* Malmgren, 1867), *Opisthodontia* Langerhans, 1879; *Xenosyllis* Marion & Bobretzky, 1875; *Syllides* Örsted, 1845; *Eusyllis* Malmgren, 1867; *Odontosyllis* Claparède, 1864; and *Amblyosyllis* Grube, 1857. Subsequently, Malaquin (1893) removed *Pionosyllis*, *Opisthodontia*, *Syllides*, *Eusyllis*, *Odontosyllis*, and *Amblyosyllis* and placed them in the subfamily Eusyllinae. Fauvel (1923) included *Eurysyllis* in the Syllinae, and Perkins (1981) proposed the same for *Plakosyllis*, and described *Dentatisyllis* Perkins, 1981. Fauchald (1977) included additional genera in the subfamily Syllinae: *Haplosyllides* Augener, 1922; *Branchiosyllis*, *Parapterosyllis* Hartmann-Schröder, 1960; *Pseudosyllides* Augener, 1927; *Geminosyllis* Imajima, 1966; *Haplosyllis* Langerhans, 1879; *Parasphaerosyllis*, *Paratyposyllis* Hartmann-Schröder, 1960; *Ehlersia* Langerhans, 1881; and *Typosyllis* Langerhans, 1879. San Martín (1984, 1992, 2003) considered *Typosyllis* and *Ehlersia* as synonymies of *Syllis*; and in (2003), proposed the name *Inermosyllis* to replace *Pseudosyllides*, as it is a homonym for *Pseudosyllides* Czerniavsky, 1882.

Recently, Glasby & Watson (2001) described another genus of Syllinae: *Alcyonosyllis*, and earlier, Hartmann-Schröder (1990) described another new genus for Australia: *Parahaplosyllis*. San Martín & López (2003) described *Karroonsyllis* from Western Australia. Currently, 18 genera are considered as belonging to the subfamily Syllinae: *Alcyonosyllis*, *Branchiosyllis*, *Dentatisyllis*, *Eurysyllis*, *Geminosyllis*, *Haplosyllides*, *Haplosyllis*, *Inermosyllis*, *Karroonsyllis*, *Nuchalosyllis*, *Opisthosyllis*, *Parahaplosyllis*, *Parasphaerosyllis*, *Plakosyllis*, *Syllis*, *Trypanosyllis*, and *Xenosyllis*. *Rhopalosyllis* was previously considered as belonging to the Eusyllinae, but is considered here as belonging to Syllinae, as it has articulated cirri and reproduces by sexual stolons. *Parapterosyllis*, *Paratyposyllis*, and *Reductotyposyllis* are not considered as valid genera, based on studies of the type material by the first author. *Parapterosyllis sexoculata* (HZM P-14728) is a damaged specimen of *Trypanosyllis*; *Paratyposyllis paurocirrata* (HZM P-14729) are two recently metamorphosed specimens of *Syllis*; *Reductotyposyllis atentaculocirrata* (HZM P-14768) is a regenerating posterior end of a species of *Syllis*.

In this paper, we erect a new genus, *Tetrapalpia* for a single species, *Opisthosyllis dorsoaciculata* Hartmann-Schröder, 1991, which has a unique character distinguishing it from all other genera, namely palps divided longitudinally by a furrow, appearing as having four palps instead of the typical two. Currently 12 of the genera regarded as belonging to the subfamily Syllinae are known to occur in Australia.

Additional new genera from Australia will be described in subsequent papers.

The subfamily Syllinae is more or less homogeneous, characterized by having articulated appendages, free or partially fused palps, and undergoing schizogamic scissiparous reproduction; but some genera have morphological characters more typical of the subfamily Eusyllinae, such as the presence of smooth, unarticulated antennae, tentacular and dorsal cirri (e.g., *Alcyonosyllis*, *Haplosyllides*) or of the Exogoninae, such as having fused palps and a single pair of tentacular cirri (*Karroonsyllis*). While these latter genera have morphological characters characteristic of other subfamilies they undergo schizogamic scissiparous reproduction which, probably is the major character for defining the subfamily Syllinae (Garwood, 1991; San Martín, 1984, 2003; Glasby, 2000). There are different kinds of stolons; for description of these see San Martín, 2003. For some genera their method of reproduction is unknown and therefore their subfamilial affiliation is unclear, and highlights the need for a major revision of the family Syllidae.

Like most syllids, Syllinae are dorsally arched, convex, ventrally flat or even concave, but some genera (*Trypanosyllis*, *Eurysyllis*, *Plakosyllis*, *Rhopalosyllis*, *Xenosyllis*, and some species of *Branchiosyllis*) have dorsoventrally flattened, ribbon-like bodies, and one species of *Branchiosyllis* described in this paper, is laterally compressed. Size range of the subfamily Syllinae varies from medium to large (see San Martín & Hutchings, 2006, for definitions of these terms). They occur in a similar range of habitats as members of other subfamilies, but are especially common on hard bottoms (see San Martín, 2003). Typically they are less fragile than the Eusyllinae, and complete, well preserved specimens necessary for detailed studies are common in museum collections. Some Syllinae are brightly coloured, with dorsal stripes. Some species of *Branchiosyllis*, and *Opisthosyllis* and all the known species of *Rhopalosyllis* and *Xenosyllis* have numerous dorsal and sometimes ventral epidermal papillae. The palps are fused, partially fused, or free from each other. Syllinae have three antennae that are typically long, extending beyond the palps. Four lensed eyes, and sometimes two additional eyespots are present, although especially the latter, may fade with time on preserved material. The peristomium has two pairs of tentacular cirri (except in a few genera in which only a single pair is present); the fronto-dorsal peristomial margin may be modified to form an occipital flap in some species of *Opisthosyllis*. Nuchal organs consist of two dorsolateral, densely ciliated grooves situated between the prostomium and peristomium. The pharynx is straight, typically with a conical tooth which is located either on the anterior margin, behind the anterior rim, or in the middle or posterior part of the pharynx; *Inermosyllis* San Martín, 2003, lacks a pharyngeal tooth, and *Trypanosyllis*, *Geminosyllis* Imajima, 1966, *Eurysyllis*, and some others, have a crown of teeth, referred to as a trepan, surrounding the pharyngeal opening.

Parapodia are uniramous, with dorsal and ventral cirri, present on all segments. Dorsal cirri typically are long, filiform, articulated. Members of the Syllinae reproduce by schizogamous scissiparity (Garwood, 1991; Franke, 1999; San Martín, 2003), developing sexual stolons with capillary notochaetae used for swimming on all segments except the first one, which remains uniramous.

## Material and methods

The material examined was mainly from the collections in the Australian Museum (AM), and was collected by many including: N. Coleman, G. Wilson, J. K. Lowry, R. T. Springthorpe, H. E. Stoddart, P. A. Hutchings, A. Murray, T. J. Ward, P. C. Young, and A. Jones. Australian material housed in the Zoologisches Museum of Hamburg (HZM), collected and identified by Hartmann-Schröder, has been re-examined and compared with Australian Museum material. The specimens are preserved in 70% ethanol after fixation in formalin. Examinations were made using a compound microscope with interference contrast optics (Nomarsky). Drawings were made using a camera lucida drawing tube. Scanning Electron Microscope observations and photographs were made at the SIDI (Servicio Interdepartamental de Investigación) of the Universidad Autónoma de Madrid, Spain.

The width of specimens, excluding parapodia and chaetae, was measured at the proventricular level.

Information about aboriginal words for the names of several new taxa was obtained from Endacott (1973). The order of descriptions, both for genera and for species in each genus, is alphabetical.

Some structures difficult to see under light microscope such as eyespots, are described only when they were observed on the specimens. While nuchal organs are present on all syllids, they are not always clearly visible, species descriptions reflect this.

Specimen size categories given in the text are: small (< 5 mm in length), medium (5–10 mm in length) and large (> 10 mm in length). Typically in syllids the length of chaetal blades within a fascicle decreases from dorsal to ventral (dorsoventral gradation); and also the shape and length of the chaetae may vary along the body, and therefore all descriptions include this information.

The *Material examined* section lists material in an anticlockwise direction around Australia, beginning from Western Australia.

The following abbreviations are used:

AM	Australian Museum, Sydney
ZMH	Zoologisches Museum für Hamburg
MNCN	Museo Nacional de Ciencias Naturales de Madrid
ZMB	Naturhistorisches Forschungsinstitut Museum für Naturkunde, Zentralinstitut der Humboldt-Universität zu Berlin
MNHN	Museum national d'Histoire naturelle, Paris

## Genus *Branchiosyllis* Ehlers, 1887

*Branchiosyllis* Ehlers, 1887: 148.

**Diagnosis.** Body of medium to large size, some species cylindrical, others dorsoventrally flattened, or laterally compressed, with numerous segments. Prostomium with 4 eyes, and sometimes 2 eyespots, 3 antennae and 2 palps. Palps fused at bases. Two pairs of tentacular cirri. Antennae, tentacular, anal and dorsal cirri distinctly articulated. Parapodia with branchiae or digitiform lobes on some species, absent on most species. Compound chaetae falcigers; blades of some or all chaetae rotated 180°, claw-shaped. Capillary simple chaetae absent. Pharynx similar in length or longer than proventricle, with an anterior tooth, surrounded by crown of about 10 soft papillae. Two anal cirri.

**Type species.** *Branchiosyllis oculata* Ehlers, 1887, by monotypy.

**Remarks.** *Branchiosyllis* on the basis of the few previously described species, was previously divided into two groups. One group, including *B. oculata*, *B. pacifica* Rioja, 1941, and *B. lamellifera* Verrill, 1900, is characterized by having dorsoventrally flattened bodies and branchiae, all chaetae claw-shaped falcigers (rotated 180°), and lacking normal falcigers (not rotated) (see Ehlers, 1887; Rioja, 1941; and Verrill, 1900). The other group has cylindrical bodies, lack branchiae, and both normal falcigers and claw-shaped falcigers are present from midbody segments onwards. This latter group consists of the *B. exilis* complex; and *B. lorenae* San Martín & Bone, 1999 and we have added the following species: *Syllis fuscoturata* Monro, 1933, and *Syllis (Typosyllis) plessisi* Rullier, 1972 (see Monro, 1933; Rullier, 1972), both considered as synonyms of *B. exilis* (Licher, 1999), as well as *Typosyllis bathialis* Kirkegaard, 1995; *Typosyllis salina* Hartmann-Schröder, 1959 (questionable); *T. maculata* Imajima, 1966; and *Syllis (Typosyllis) verruculosa* Augener, 1913 (see Kirkegaard, 1995; Hartmann-Schröder, 1959; Imajima, 1966; Augener, 1913), transferred by Licher (1999) to *Branchiosyllis*. *Branchiosyllis abranchiata* Hartmann-Schröder, 1965, from Samoa/Tutuila, is a small specimen (see Hartmann-Schröder, 1965), probably a juvenile which may represent *B. exilis*; based on a re-examination of the type specimen (HZM P-14574).

One species, *B. diazi* Rioja, 1958, has an intermediate position between the two groups, in that it has branchiae, dorsoventrally flattened body as in the first group, and both normal falcigers and claw-shaped falcigers in posterior parapodia as in the second group as does *B. baringabooreen* n.sp. Specimens of *B. roldanae* n.sp., have few chaetae present and are attributed to *Branchiosyllis* based on the chaetal structure of these few chaetae. This study reveals that the two groups of *Branchiosyllis* are not well defined and relationships within the genus must be re-evaluated.

The species *Syllis (Typosyllis) cirropunctata* is transferred to the genus *Branchiosyllis* because of the presence of the compound chaetae characteristic of the genus, and it is close to *B. exilis*.



Key to Australian species of *Branchiosyllis*

- 1 Body laterally compressed ..... *B. orbiniiformis* n.sp.  
 — Body dorsoventrally flattened or cylindrical ..... 2
- 2 Body dorsoventrally flattened ..... 3  
 — Body cylindrical ..... 4
- 3 Body uniformly dark or with transversal dark bands (sometimes without colour pattern). All chaetae claw-shaped falcigers. Dome-shaped branchiae on parapodial lobes ..... *B. oculata*  
 — Body with distinctive black and white pigmentation. Chaetal fascicle with some normal falcigers and claw-shaped falcigers. Branchiae absent ..... *B. baringabooreen* n.sp.
- 4 Body papillated ..... *B. verruculosa*  
 — Body smooth ..... 5
- 5 Large specimens with few chaetae (not broken). Dorsal band of segmental glands, opening with minute pores (SEM) ..... *B. carmenroldanae* n.sp.  
 — Parapodia with numerous chaetae on all individuals. Dorsal bands of segmental glands absent ..... 6
- 6 Segments with distinct complete transverse black band ..... *B. thylacine* n.sp.  
 — Without colour pattern or, if present, forming incomplete bands ..... 7
- 7 Without distinct colour pattern ..... *B. exilis*  
 — With colour pattern, especially distinct dark spots on some articles of dorsal cirri ..... 8
- 8 Compound chaetae of posterior parapodia, all claw-shaped falcigers (Fig. 6E–F), shafts angular, with subdistal spurs ..... *B. cirropunctata* n.comb.  
 — Compound chaetae of posterior parapodia, of 2 kinds, claw-shaped and unmodified falcigers (Fig. 9F), shafts angular without subdistal spurs ..... *Branchiosyllis maculata*

*Branchiosyllis baringabooreen* n.sp.

Figs 1A–D, 2A–E

**Material examined.** HOLOTYPE (AM W30088) **Western Australia:** Bernouli Island, 15°00'S 124°47'E, sandy substrate with coral rubble, intertidal, coll. P.A. Hutchings, 12 July 1988. PARATYPES 1 (AM W26511) W side of Cassini Island, 13°57'S 125°37'E, coralline algae and rubble, low tide, coll. P.A. Hutchings, 18 July 1988; 1 on SEM stub (AM W29247) Condillac Island, 14°06'S 125°33'E, sand, coral rubble, 11 m, coll. P.A. Hutchings, 15 July 1988; 1 (AM W30089) Bernouli Island, 15°00'S 124°47'E, coll. P.A. Hutchings, 12 July 1988; 2 (AM W30090) Reef S of Lucas Island, Brunswick Bay, 15°16'S 124°29'E, dead coral with *Sargassum* with heavy silt loading, 2 m, coll. P.A. Hutchings, 24 July 1988.

**Description.** Body ovate, large, strongly dorsoventrally flattened (Figs 1A, 2A); prostomium and peristomium slightly pigmented, chaetiger 1 more pigmented than chaetigers 2 and 3, subsequent segments alternating between one strongly pigmented with dark nearly black dorsal cirri, followed by a less pigmented segment and dorsal cirri (Fig. 1A). One dorsal oval spot on dorsum of each segment, except for those most anterior. Holotype 12 mm long, 1.5 mm maximum width, with 75 chaetigers; largest specimen 16 mm long, 1.8 mm wide, with 95 chaetigers. Prostomium relatively small, ovate (Figs 1A, 2A); 4 small eyes in open trapezoidal arrangement, almost vertically aligned. Antennae inserted near anterior margin of prostomium, all similar in length, slightly shorter than combined length of prosto-

mium and palps, with about 10 articles. Palps large, slightly ventrally folded. Nuchal organs not observed. Peristomium slightly shorter than subsequent segments; dorsal tentacular cirri longer than antennae, with about 13 articles; ventral tentacular cirri similar in length to antennae, with 7–8 articles. Following segments gradually increasing in width (Figs 1A, 2A) until midbody, then becoming progressively narrower posteriorly. Cirrophores well developed (Figs 1B, 2B), with single basal black spot. Dorsal cirri spindle-shaped, with distinct, rectangular articles, distal one conical; alternating irregularly; long dorsal cirri, with 16–18 articles, and short cirri, 10–11 articles; all dorsal cirri shorter than body width. Parapodia blunt, without branchiae (Fig. 1B). Ventral cirri digitiform, shorter than parapodial lobes. Typically 4 compound chaetae per parapodium, all similar (Fig. 1C), 3 dorsal ones with claw-shaped, blades rotated 180°, 47–50 µm long, and one ventral with strongly hooked blade, about 33 µm long; some parapodia with only 2–4 falcigers, all claw-shaped (Figs 2C–E); all blades smooth and unidentate; shafts thick. Parapodia with 2 straight, slender aciculae, one distally pointed, other with slightly oblique tip (Fig. 1D). Pharynx relatively slender, through 7–8 segments; pharyngeal tooth small, anteriorly located (Fig. 1A). Proventricle proportionally slender, through 5–6 segments, with 33–35 muscle cell rows. Pygidium small, with 2 anal cirri similar to dorsal cirri but shorter. Some specimens with acephalous sexual stolons.



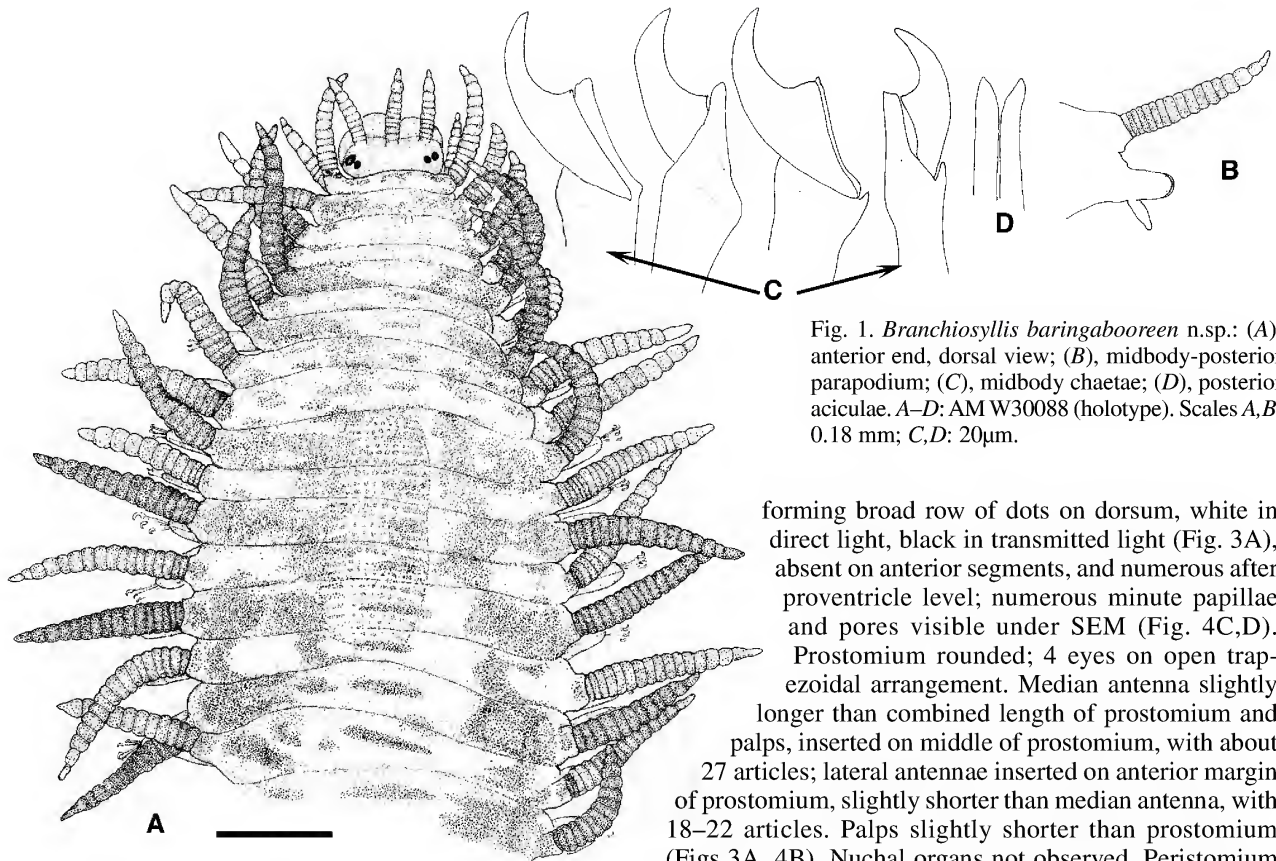


Fig. 1. *Branchiosyllis baringabooreen* n.sp.: (A), anterior end, dorsal view; (B), midbody-posterior parapodium; (C), midbody chaetae; (D), posterior aciculae. A–D: AM W30088 (holotype). Scales A, B: 0.18 mm; C, D: 20  $\mu$ m.

**Remarks.** *Branchiosyllis baringabooreen* n.sp., is characterized by having the combination of a flattened body, with a distinctive black and white colour pattern, lacking branchiae on the parapodial lobes, and in the distribution of falcigers, three of them claw-like with blades rotated 180° and one unmodified. On some parapodia, all falcigers are claw-shaped. This colour pattern is not found in any other species of *Branchiosyllis*.

**Etymology.** The specific name is derived from two aboriginal words; *Baringa*, meaning light, and *Booreen*, meaning dark, in reference to the distinctive colour pattern of this species.

**Habitat.** Intertidal to shallow subtidal in sand and in amongst coral rubble.

**Distribution.** Australia (North Western Australia).

### *Branchiosyllis carmenroldanae* n.sp.

Figs 3A–D, 4A–F

**Material examined.** HOLOTYPE (AM W30118) PARATYPES, 4 (1 on SEM stub), (AM W30119) **Western Australia:** Goss Passage, Beacon Is., 28°25'30"S 113°47'E, dead plates of *Acropora* sp., covered in coralline algae, 8 m, coll. P.A. Hutchings, 19 May 1994.

**Description.** Holotype 30 mm long, 0.4 mm wide, with 106 chaetigers, plus an attached acephalous stolon, 1.3 mm long, with 15 chaetigers. Body cylindrical dorsally (Figs 3A, 4A), long and slender, white in alcohol; dermal glands

forming broad row of dots on dorsum, white in direct light, black in transmitted light (Fig. 3A), absent on anterior segments, and numerous after proventricle level; numerous minute papillae and pores visible under SEM (Fig. 4C,D). Prostomium rounded; 4 eyes on open trapezoidal arrangement. Median antenna slightly longer than combined length of prostomium and palps, inserted on middle of prostomium, with about 27 articles; lateral antennae inserted on anterior margin of prostomium, slightly shorter than median antenna, with 18–22 articles. Palps slightly shorter than prostomium (Figs 3A, 4B). Nuchal organs not observed. Peristomium shorter than subsequent segments, with small anterior lobe (Figs 3A, 4B); dorsal tentacular cirri longer than median antenna, with about 15 articles, ventral ones shorter than dorsal tentacular cirri, with 9–10 articles. Dorsal cirri spindle-shaped, provided with distinct cirrophores, and short, indistinct articles (Figs 3A, 4A,B,E). Dorsal cirri of chaetiger 1 long, with 50–55 articles (Fig. 3A); subsequent dorsal cirri alternating long and short, long with up to 47, and short, with 35 articles in midbody segments. Parapodial lobes distally bilobed, prechaetal and postchaetal lobes rounded (Fig. 3B), postchaetal lobes larger than anterior ones (Fig. 4E). Ventral cirri digitiform, similar in length to parapodial lobes. Parapodia usually without obvious chaetae (Fig. 4E), with 1–2 short chaetae in few parapodia of some specimens; in some cases minute, difficult to see chaetae embedded in parapodial lobes (Fig. 3B). Blades of chaetae when present falcigerous, unidentate (Figs 3C, 4F); in some anterior segments, one falciger has a normal blade and another has a curved, claw-shaped blade; on midbody and posterior segments, two claw-shaped falcigers, may be present. Anterior parapodia each with 2–3 unequal, relatively thick aciculae, slightly oblique at tip (Fig. 4E); from midbody onwards, solitary acicula, thick, and distally oblique (Fig. 3D). Pharynx through about 6 segments; pharyngeal tooth anteriorly located (Fig. 3A), surrounded by crown of 10 soft papillae. Proventricle similar in length to pharynx, present through 6 segments, with about 50 muscle cell rows. Pygidium small, with 2 anal cirri similar to dorsal cirri.

**Remarks.** *Branchiosyllis carmenroldanae* n.sp., is characterized by having a thin, slender body, with a broad band of dots on each segment, spindle-shaped cirri, with indistinct

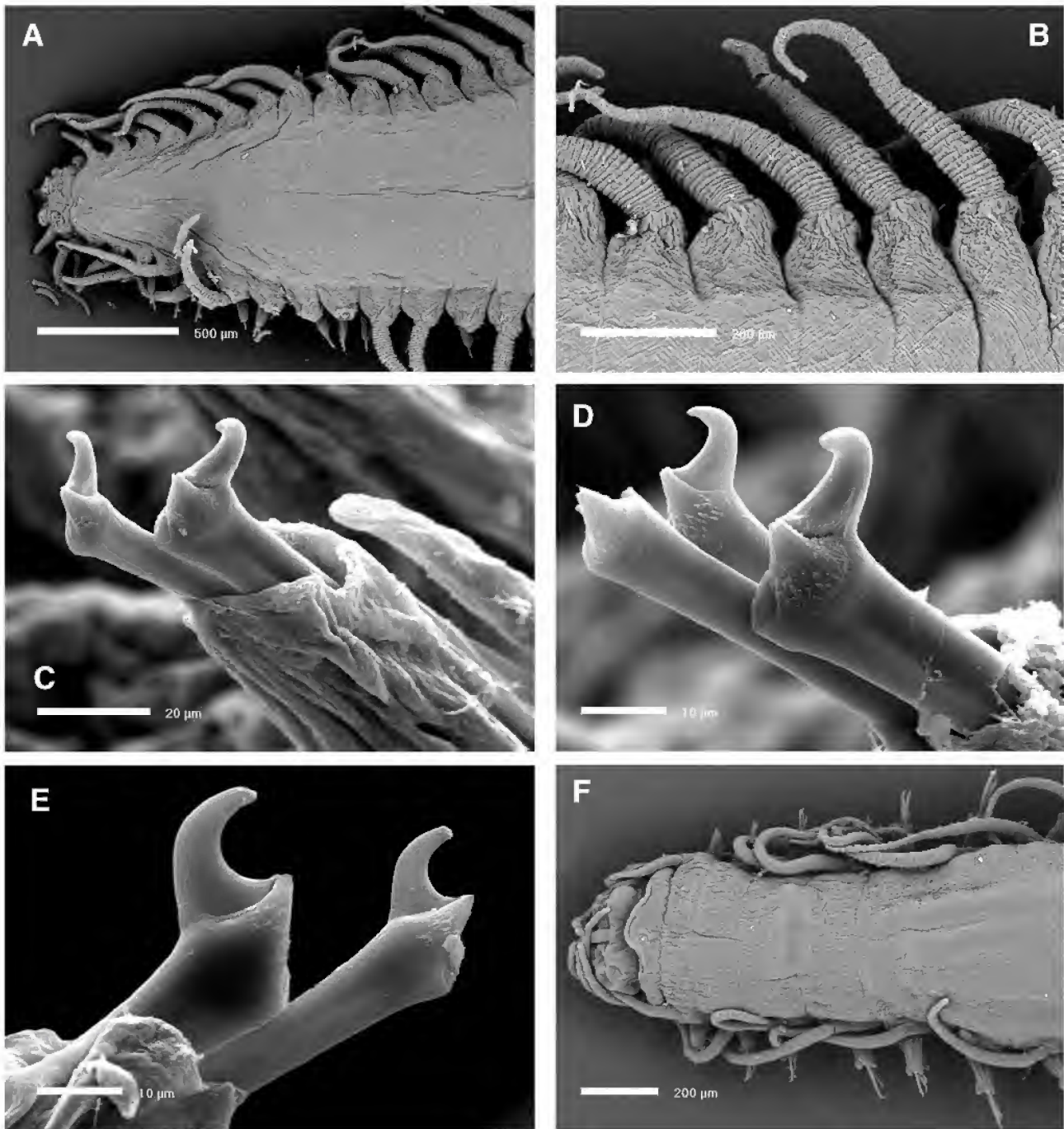


Fig. 2. SEM of *Branchiosyllis baringabooreen* n.sp.: (A), anterior end, dorsal view; (B), midbody dorsal cirri; (C–E), midbody and posterior chaetae. SEM of *Branchiosyllis cirropunctata* (Michel, 1909): (F), anterior end, dorsal view. A–E: AM W29247, F: AM W30093.

articles, thick aciculae, bilobed parapodial lobes, and especially by the lack of chaetae. All material examined is in good condition. Most parapodia lack chaetae or if they are present, they are minute, embedded in the parapodial lobe. Smaller specimens have some parapodia with chaetae or only shafts. Specimens of other species of Syllidae found in the same sample have numerous chaetae, so we consider that the near complete absence of chaetae is a valid character for this species and not the result of damage during collection. We believe that the chaetae are lost as the individual grows.

**Habitat.** Found on dead plates of *Acropora* sp., covered in coralline algae, 8 m.

**Distribution.** Australia (Central Western Australia).

**Etymology.** The species is named after Dr Carmen Roldán, friend and colleague, and who was the professor of the first author (GSM) in the University Complutense of Madrid.



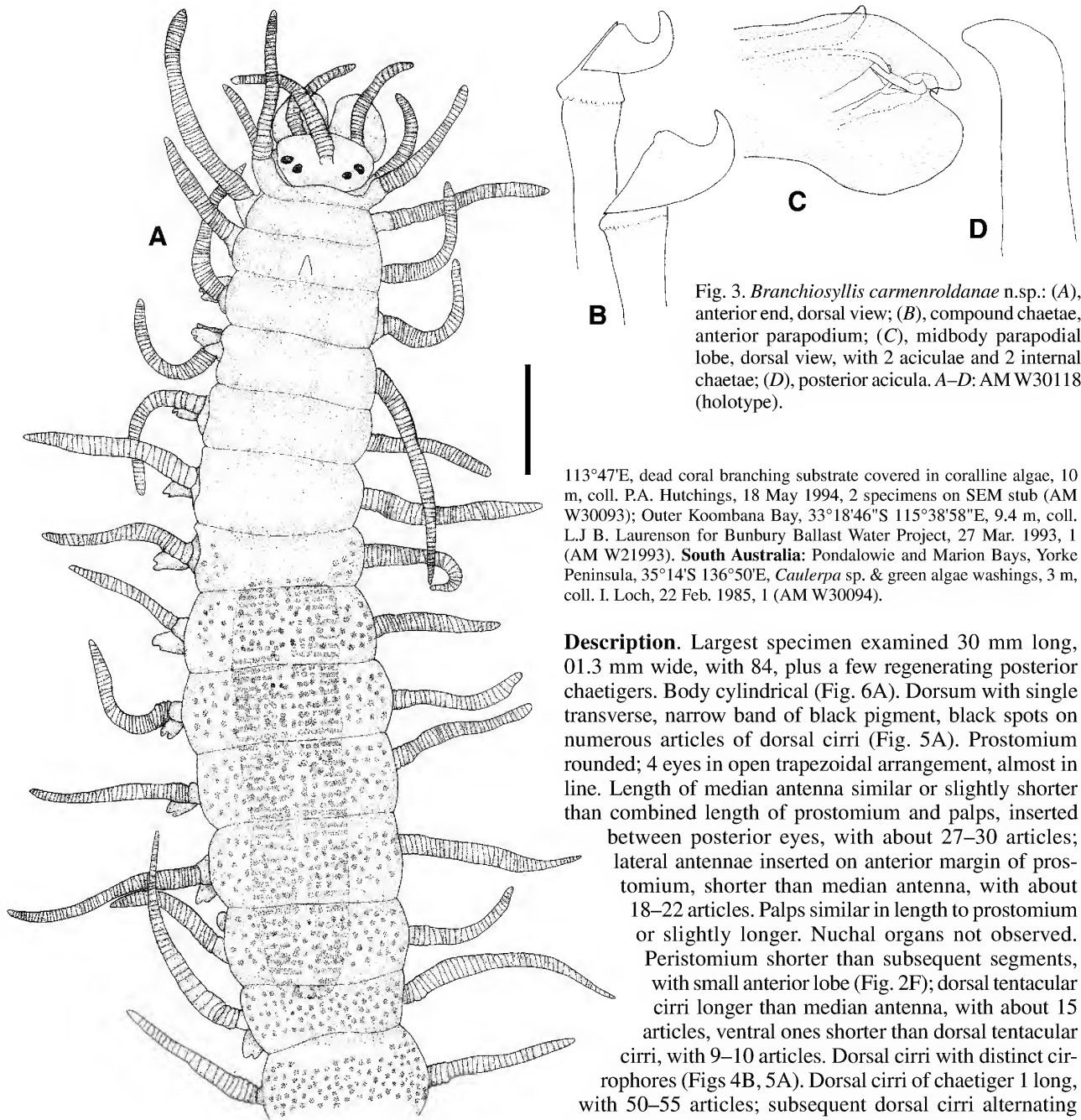


Fig. 3. *Branchiosyllis carmenroldanae* n.sp.: (A), anterior end, dorsal view; (B), compound chaetae, anterior parapodium; (C), midbody parapodial lobe, dorsal view, with 2 aciculae and 2 internal chaetae; (D), posterior acicula. A–D: AM W30118 (holotype).

113°47'E, dead coral branching substrate covered in coralline algae, 10 m, coll. P.A. Hutchings, 18 May 1994, 2 specimens on SEM stub (AM W30093); Outer Koombana Bay, 33°18'46"S 115°38'58"E, 9.4 m, coll. L.J.B. Laurenson for Bunbury Ballast Water Project, 27 Mar. 1993, 1 (AM W21993). **South Australia:** Pandalowie and Marion Bays, Yorke Peninsula, 35°14'S 136°50'E, *Caulerpa* sp. & green algae washings, 3 m, coll. I. Loch, 22 Feb. 1985, 1 (AM W30094).

**Description.** Largest specimen examined 30 mm long, 01.3 mm wide, with 84, plus a few regenerating posterior chaetigers. Body cylindrical (Fig. 6A). Dorsum with single transverse, narrow band of black pigment, black spots on numerous articles of dorsal cirri (Fig. 5A). Prostomium rounded; 4 eyes in open trapezoidal arrangement, almost in line. Length of median antenna similar or slightly shorter than combined length of prostomium and palps, inserted between posterior eyes, with about 27–30 articles; lateral antennae inserted on anterior margin of prostomium, shorter than median antenna, with about 18–22 articles. Palps similar in length to prostomium or slightly longer. Nuchal organs not observed. Peristomium shorter than subsequent segments, with small anterior lobe (Fig. 2F); dorsal tentacular cirri longer than median antenna, with about 15 articles, ventral ones shorter than dorsal tentacular cirri, with 9–10 articles. Dorsal cirri with distinct cirrophores (Figs 4B, 5A). Dorsal cirri of chaetiger 1 long, with 50–55 articles; subsequent dorsal cirri alternating long and short, with up to 47 and 35 articles respectively on midbody. Parapodial lobes distally bilobed, prechaetal and postchaetal lobes digitiform, similar in length and shape, posterior one slightly wider (Figs 5A, 6B). Ventral cirri digitiform, similar in length to parapodial lobes. Typically 9–10 compound heterogomph chaetae on anterior parapodia, blades falcigerous, slightly bidentate, smooth on margin (Fig. 5B), all similar, with slender shafts, blades 20 µm; on posterior parapodia, shafts becoming larger, with more marked angular shafts on ventral chaetae, marginally smooth, unidentate (Figs 5D, 6C, 8A). Posterior parapodia with blades of some (1–2) ventral falcigers rotated 180°, becoming claw-shaped, with short shafts; remaining 5–6 falcigers with thick shafts and pronounced subdistal spur (below point of articulation) with blade and hooked blades, unidentate or slightly bidentate (Fig. 6D,E), 37–33 µm long. Most posterior parapodia with only claw-shaped falcigers, shafts enlarged,

***Branchiosyllis cirropunctata***  
(Michel, 1909), n.comb.

Figs 2F, 5A–F, 6A–F, 8A

*Syllis* (*Typosyllis*) *cirropunctata* Michel, 1909: 318.–Fauvel, 1923: 266, figs 99n–p.–Day, 1967: 250, fig. 12.4k–l; 1975: 190.

*Typosyllis* (*Typosyllis*) *cirropunctata*.–Hartmann-Schröder, 1984: 14, figs 13–15; 1985: 65; 1986: 38.

**Material examined. Western Australia:** Goss Passage, Beacon Island, 28°25'30"S 113°47'E, dead plates of *Acropora* sp. covered in coralline algae, 8 m, coll. P.A. Hutchings, 19 May 1994, 2 (AM W30091); NE entrance to Goss Passage, Beacon Island, 28°27'54"S 113°46'42"E, dead plate-like *Acropora* sp. covered in coralline algae, 8 m, coll. P.A. Hutchings, 25 May 1994, 1 (AM W30092); Goss Passage, Beacon Island, 28°25'30"S



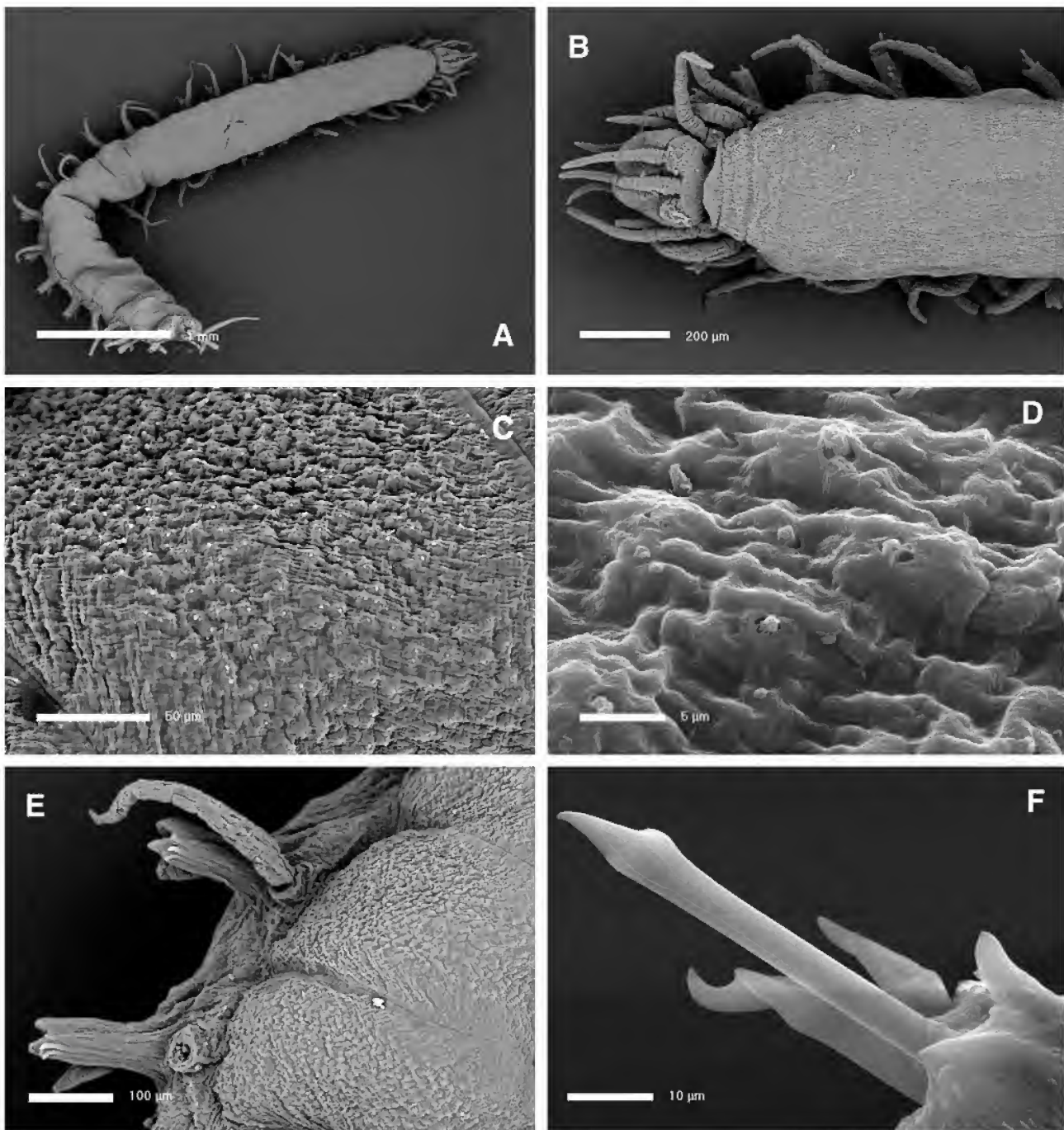


Fig. 4. SEM of *Branchiosyllis carmenroldanae* n.sp.: (A), dorsal view of an incomplete specimen; (B), anterior end, dorsal view; (C), dorsum; (D), detail of dorsal pores; (E), mid-posterior parapodia, dorsal view, showing the emergent aciculae; (F), chaetae. A–F: AM W30119.

with pronounced protruberances below point of articulation with blade (Figs 4F, 5F). Anterior parapodia each with 3–4 slender aciculae, all straight, pointed (Fig. 5C); from midbody onwards, number of aciculae per parapodium decreasing to 2 in each posterior parapodium, of different sizes, slightly obliquely expanded at tips (Fig. 5E). Pharynx through 6–7 segments; pharyngeal tooth located anteriorly, surrounded by crown of 10 soft papillae. Proventricle similar in length to pharynx, through 6 segments, with 40–42 muscle cell rows, and distinct mid-dorsal line. Pygidium small, with 2 anal cirri similar to dorsal cirri. Some specimens with attached acephalous stolon, small, short, only 8–10 chaetigers.

**Remarks.** *Branchiosyllis maculata* (Imajima, 1966) and *B. cirropunctata*, are similar in body size, shape and colour pattern. However, the former has posterior parapodia with claw-shaped falcigers and unmodified, normal, unidentate falcigers, and shafts with small subdistal spurs below the point of articulation (Fig. 13A,B). *Branchiosyllis cirropunctata*, has claw-shaped falcigers only on far posterior segments, and they have large subdistal spurs on the head of the shaft (Fig. 6F).

San Martín (2003) and Licher (1999) erroneously considered *Syllis cirropunctata* as a synonym of *Branchiosyllis exilis* (Gravier, 1900), based on specimens from the Spanish Mediterranean, as they share a similar colour pattern; but

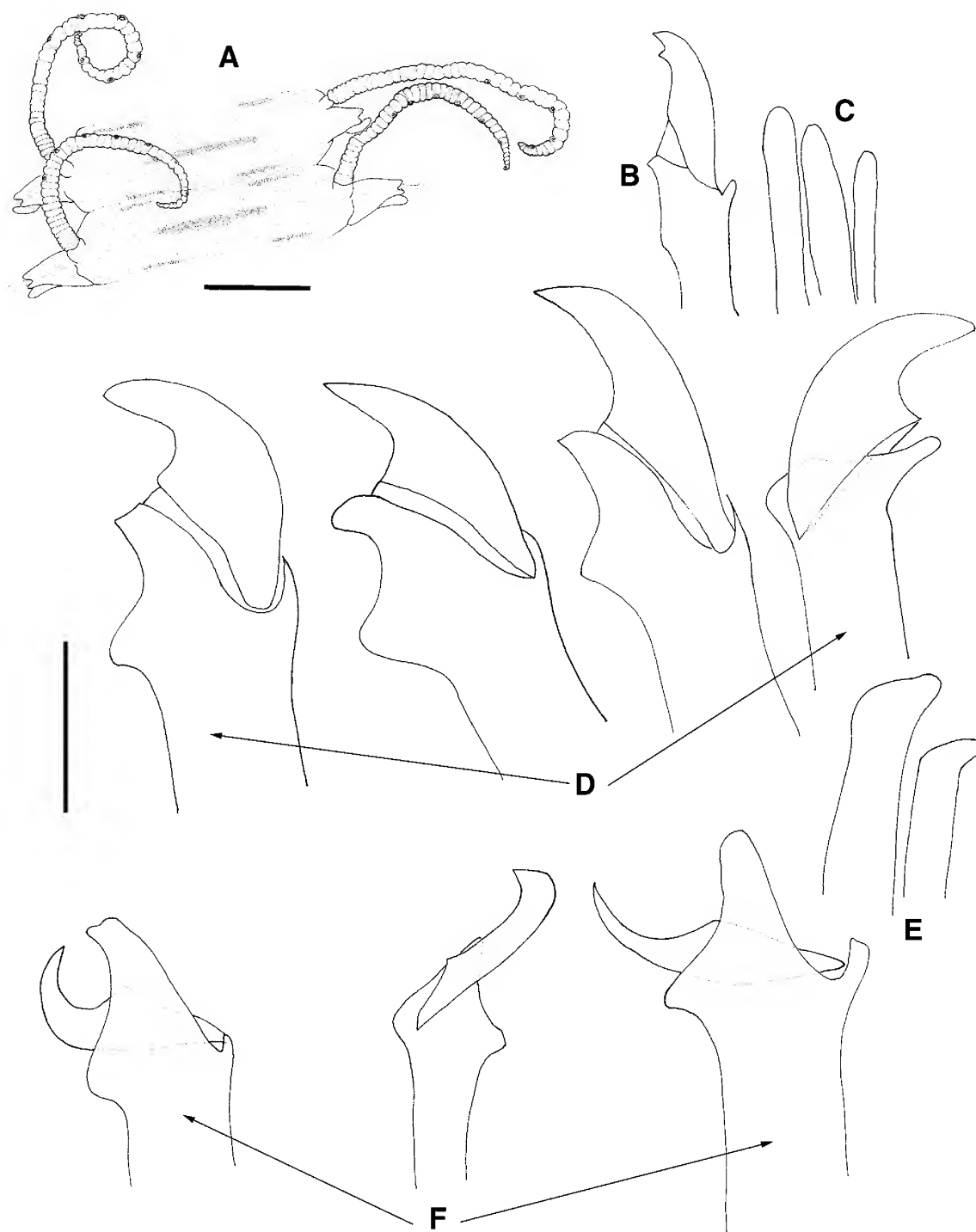


Fig. 5. *Branchiosyllis cirropunctata* (Michel, 1909): (A), midbody segments, dorsal view; (B), compound chaeta, from 1st parapodium; (C), aciculae, anterior parapodium; (D), midbody chaetae; (E), posterior aciculae; (F), posterior chaetae. A: AM W21993. B–F: AM W30097. Scales A, 0.37 mm, B–F 20  $\mu$ m.

these specimens lack falcigers with the head of the shaft with protruberances; we now consider them as distinct species.

**Habitat.** Shallow water associated with algae.

**Distribution.** Mediterranean, Central Pacific, Indian Ocean, Australia (Central and South Western Australia and South Australia).

### *Branchiosyllis exilis* (Gravier, 1900)

Figs 7A–F, 8B–F, 10A–B

*Syllis* (*Typosyllis*) *exilis* Gravier, 1900: 160, figs 28–30.–Augener, 1913: 192.

*Trypanosyllis uncinigera* Hartmann-Schröder, 1960: 86, figs 54–58.

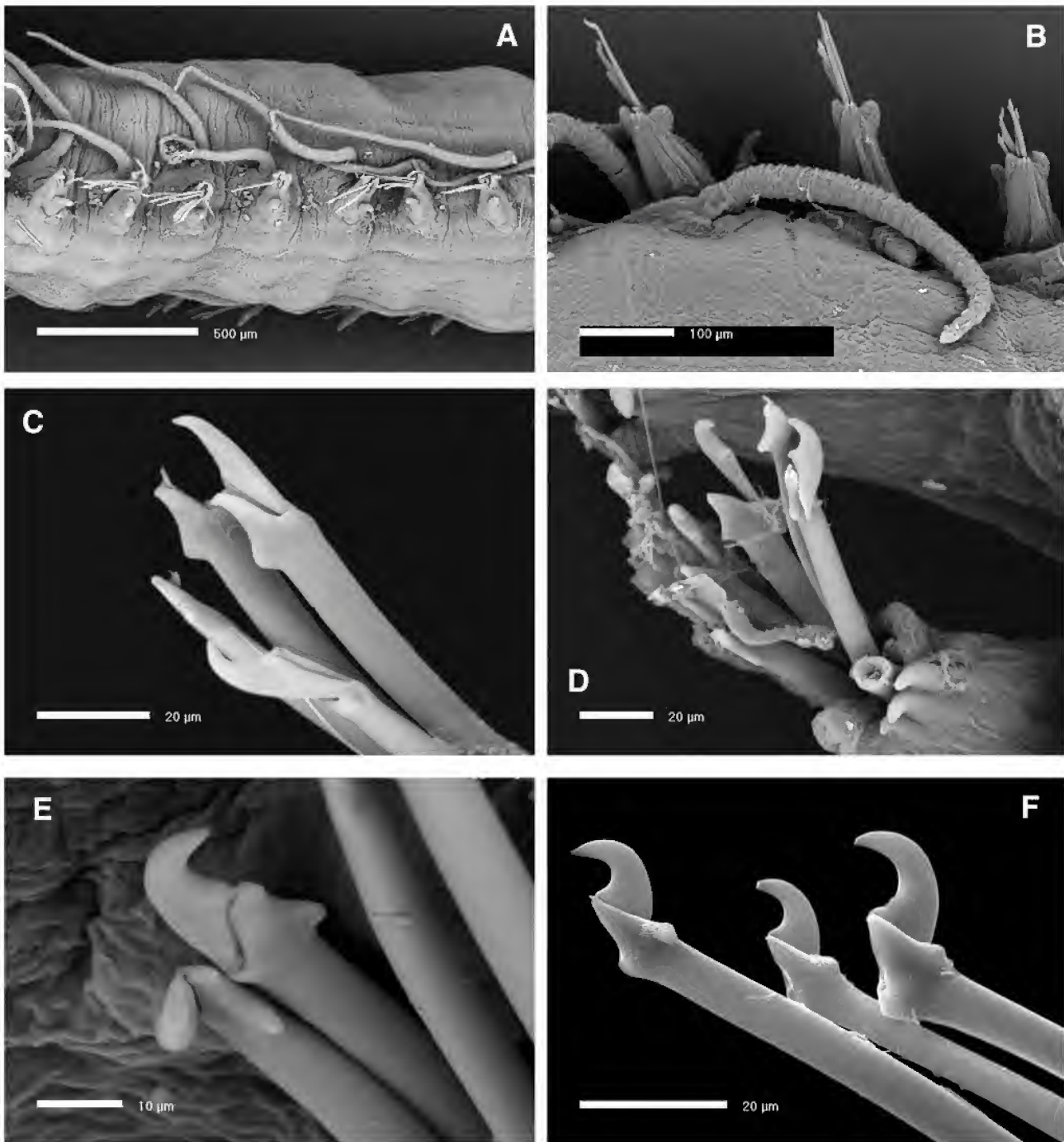


Fig. 6. SEM of *Branchiosyllis cirropunctata* (Michel, 1909): (A), midbody segments, lateroventral view; (B), midbody parapodia, dorsal view; (C), anterior-medium chaetae; (D), mid-posterior chaetae; (E), mid-posterior chaeta; (F), posterior chaetae. A–F: AM W30093.

*Branchiosyllis uncinigera* Harlock & Laubier, 1966: 18, figs 1–3.

?*Branchiosyllis exilis* Westheide, 1974: 60, fig. 26.—Uebelacker, 1984: 30–105, fig. 30–100.—San Martín, 1984: 294, figs 69–72; 1991: 233; 2003: 332, figs 184, 185.—Hartmann-Schröder, 1986: 37; 1991: 24, figs 14–18.—Capa *et al.*, 2001 a: 105.—Aguado *et al.*, 2008: 6–7, figs 1, 2.

?*Syllis (Typosyllis) fuscoturata* Augener, 1922: 43.

?*Syllis fuscoturata* Monro, 1933: 32, text-fig. 14.

**Material examined. Western Australia:** Kimberley region Bernouli Is. 15°S 124°47'E, sandy substrate with coral rubble, intertidal, coll. P.A. Hutchings, 12 July 1988, 4 (AM W30095); Reef S of Lucas Is., Brunswick Bay, 15°16'S 124°29'E, dead coral and *Sargassum* with heavy silt loading, 2

m, coll. P.A. Hutchings, 24 July 1988, 8 (AM W30096); SW corner of Lucas Is., 15°13'S 124°31'E, dead coral substrate, 2–30 m, coll. P.A. Hutchings, 24 July 1988, 1 (AM W30099); Inshore reef off Neds Camp, Cape Range National Park, 21°59'S 113°59'E, *Caulerpa* sp., 1 m, coll. J.K. Lowry, 2 Jan. 1984, 10 (AM W30101); Bush Bay, 30 km S of Carnarvon, 25°10'S 113°39'E, extensive shallow sand flats, brown algal covered cockle shells, 0.5 m, coll. H.E. Stoddart, 6 Jan. 1984, 1 (AM W30102); Houtman Abrohlos, Goss Passage, Beacon Is., 28°25'30"S 113°47'E, dead coral substrate in fine sediment at foot of reef slope, 33 m, coll. P.A. Hutchings, 23 May 1994, 1 (AM W30097); off S end of Long Is., 28°28'48"S 113°46'18"E, dead coral substrate covered in coralline algae, 5 m, coll. P.A. Hutchings, 25 May 1994, 5 (AM W30098); E side of West Wallabi Is., 28°27'54"S 113°40'54"E, *Posidonia australis* root mat with epifauna, 2 m, coll. P.A. Hutchings, 26 May 1994, 4 (AM W30100). **Tasman Sea,** reef flat near wreck "Yoshin Maru Iwaki", Elizabeth Reef, 29°55'48"S 159°01'18"E, small heads of



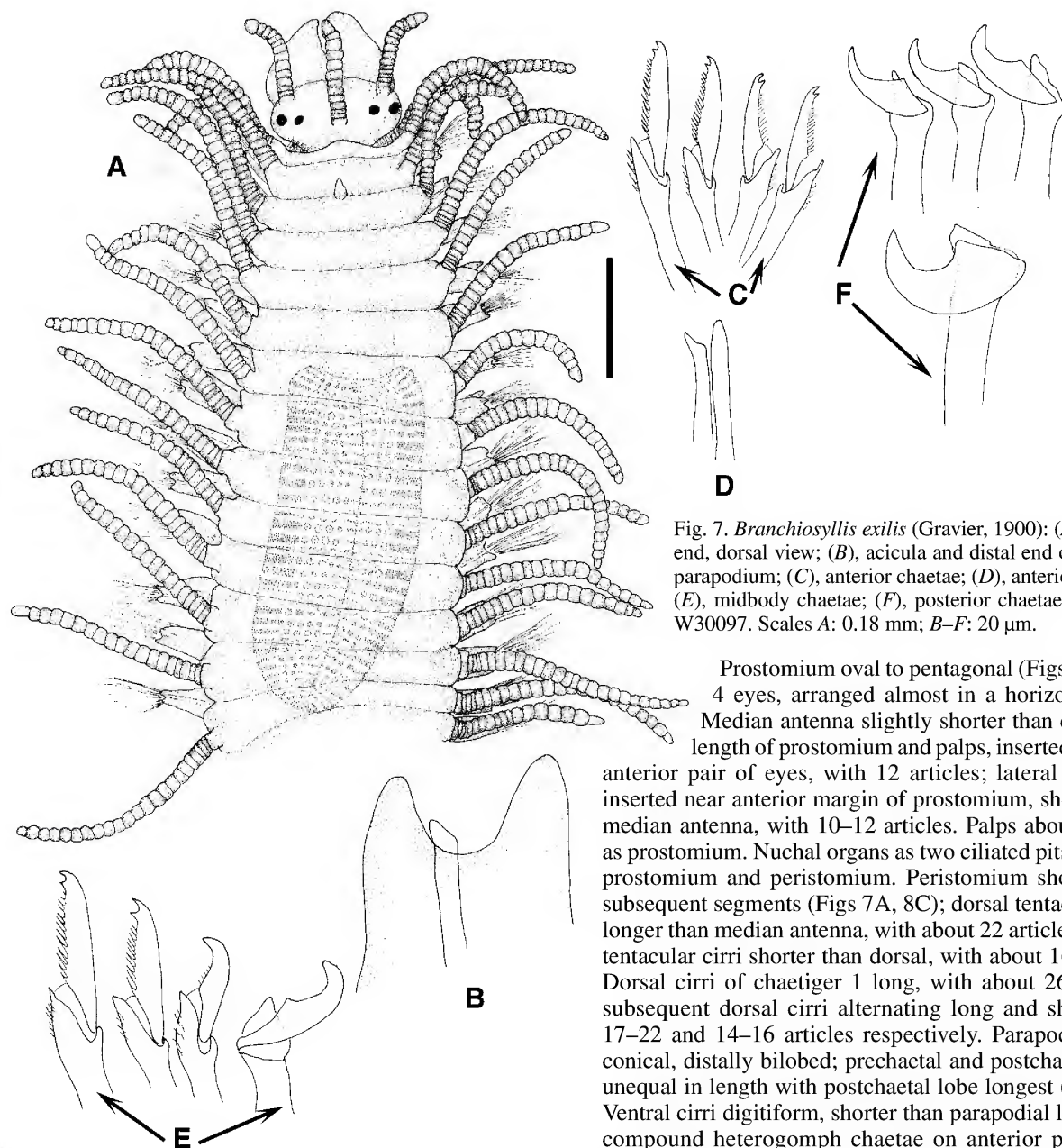


Fig. 7. *Branchiosyllis exilis* (Gravier, 1900): (A), anterior end, dorsal view; (B), acicula and distal end of posterior parapodium; (C), anterior chaetae; (D), anterior aciculae; (E), midbody chaetae; (F), posterior chaetae. A–F: AM W30097. Scales A: 0.18 mm; B–F: 20  $\mu$ m.

Prostomium oval to pentagonal (Figs 7A, 8C); 4 eyes, arranged almost in a horizontal line.

Median antenna slightly shorter than combined length of prostomium and palps, inserted between anterior pair of eyes, with 12 articles; lateral antennae inserted near anterior margin of prostomium, shorter than median antenna, with 10–12 articles. Palps about as long as prostomium. Nuchal organs as two ciliated pits between prostomium and peristomium. Peristomium shorter than subsequent segments (Figs 7A, 8C); dorsal tentacular cirri longer than median antenna, with about 22 articles, ventral tentacular cirri shorter than dorsal, with about 16 articles. Dorsal cirri of chaetiger 1 long, with about 26 articles; subsequent dorsal cirri alternating long and short, with 17–22 and 14–16 articles respectively. Parapodial lobes conical, distally bilobed; prechaetal and postchaetal lobes unequal in length with postchaetal lobe longest (Fig. 7B). Ventral cirri digitiform, shorter than parapodial lobes. 6–8 compound heterogomph chaetae on anterior parapodia, blades falcigerous, bidentate (Figs 7C, 8D), with marginal short spines, upper blades 22–23  $\mu$ m, lower ones 15  $\mu$ m, changing progressively along body, with some blades becoming unidentate and marginally smooth; from midbody onwards some chaetal blades rotated 180°, becoming claw-shaped; number of claw-shaped falcigers increasing and unmodified falcigers decreasing posteriorly (Figs 7E, 8E, F, 10A); posterior parapodia with 4–5 claw-shaped falcigers, differing in size, with larger ones ventrally (Figs 7F, 10B). Anterior parapodia with 2 slender aciculae, 1 straight and 1 with tip slightly oblique (Figs 7D, 8D); from midbody posteriorly, single acicula in each parapodium, thicker than anterior ones, with tip slightly deflected (Fig. 7B). Pharynx through 5–6 segments; pharyngeal tooth located anteriorly (Fig. 7A). Proventricle longer than pharynx, through 7–8 segments, with 27–30 muscle cell rows. Pygidium small, with 2 anal cirri similar in shape and length to dorsal cirri.

*Acropora valida*, *Pocillopora damicornis*, intertidal, coll. J.K. Lowry & R.T. Springthorpe, 14 Dec. 1987, 26 (4 on SEM stub), (AM W30103); Taupo Seamount, 33°16'51"S 156°09'09"E, benthic sled, 244 m, coll. J.K. Lowry on RV "Franklin", 2 May 1989, few (AM W30106). **New South Wales:** SW side of South Solitary Is., 30°12'S 153°16'E, coral rubble, 18 m, coll. R.T. Springthorpe, 24 June 1992, 1 (AM W30104); Manta Reef, North West Solitary Is., 30°01'30"S 153°16'30"E, lace bryozoan, 19 m, coll. R.T. Springthorpe, 25 June 1992, 1 (AM W30105). **Northern Territory:** Lee Point, Darwin Harbour, 12°20'S 130°53'48"E, dead coral rubble washings, 3 m, coll. P.A. Hutchings, 11 July 1993, 1 (AM W30107).

**Additional material examined.** 2 syntypes of *Syllis* (*Typosyllis*) *fuscusuturata*, Tortugas Is. (Florida, USA), SW Channel & third Key Rift, ZMB 6598. *Syllis exilis* Gravier, 1900, Djibouti, Gulf of Aden, holotype, MNHN polytype 143.

**Description.** Largest specimen examined 6 mm long, 0.45 mm wide, with 50 segments, but some specimens reported from other areas of greater length and with more segments. Body cylindrical in dorsal view (Fig. 8B). Dorsum of some specimens with transverse bands on some anterior segments and black spots on some articles of dorsal cirri.

**Remarks.** *Branchiosyllis exilis* belongs to the group of species having a cylindrical body, lacking branchiae,

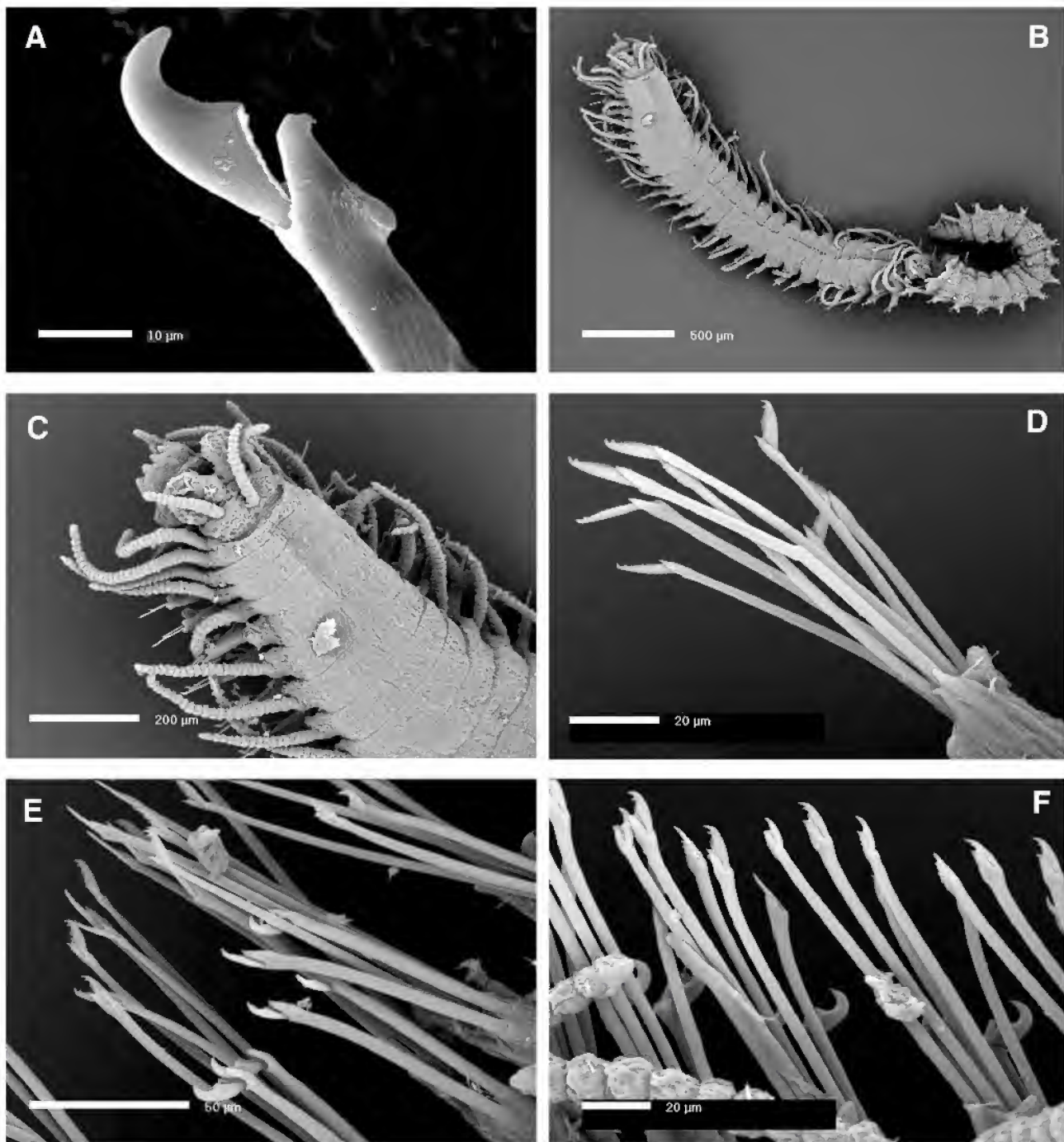


Fig. 8. SEM of *Branchiosyllis cirropunctata* (Michel, 1909): (A), posterior chaeta. SEM of *Branchiosyllis exilis* (Gravier, 1900): (B), complete specimen, dorsal view; (C), anterior end, dorsal view; (D), chaetae, anterior parapodium; (E), anterior-midbody chaetae; (F), posterior-midbody chaetae. A: AM W30093; B–F: AM W30103.

and having both normal (unmodified) and claw-shaped falcigers. This group consists of *Branchiosyllis verruculosa*, described below, *Branchiosyllis lorenae* San Martín & Bone, 1999, from the Caribbean Sea (San Martín & Bone, 1999), *Branchiosyllis salina* (Hartmann-Schröder, 1959) (questionable), *B. maculata* (Imajima, 1966), and *B. bathyalis* (Kirkegaard, 1995) (see Licher, 1999). *Branchiosyllis exilis* can be distinguished from these species by the structure of the falcigers. Some of these species have only one claw-shaped falciger in posterior parapodia, and others have both normal falcigers and claw-shaped falcigers in posterior parapodia. Syntypes of *Syllis fuscoturata* Augener, 1922, differ from

Australian specimens of *B. exilis* in having longer dorsal cirri, and distally hooked shafts, but it is certainly a member of *Branchiosyllis*. A detailed revision of the entire *B. exilis* complex is needed.

**Habitat.** Found in shallow depths to 244 m in amongst coral rubble and algae.

**Distribution.** Circumtropical, warmer areas of the Mediterranean Sea, Australia (North and central Western Australia, South Australia, New South Wales, Northern Territory).



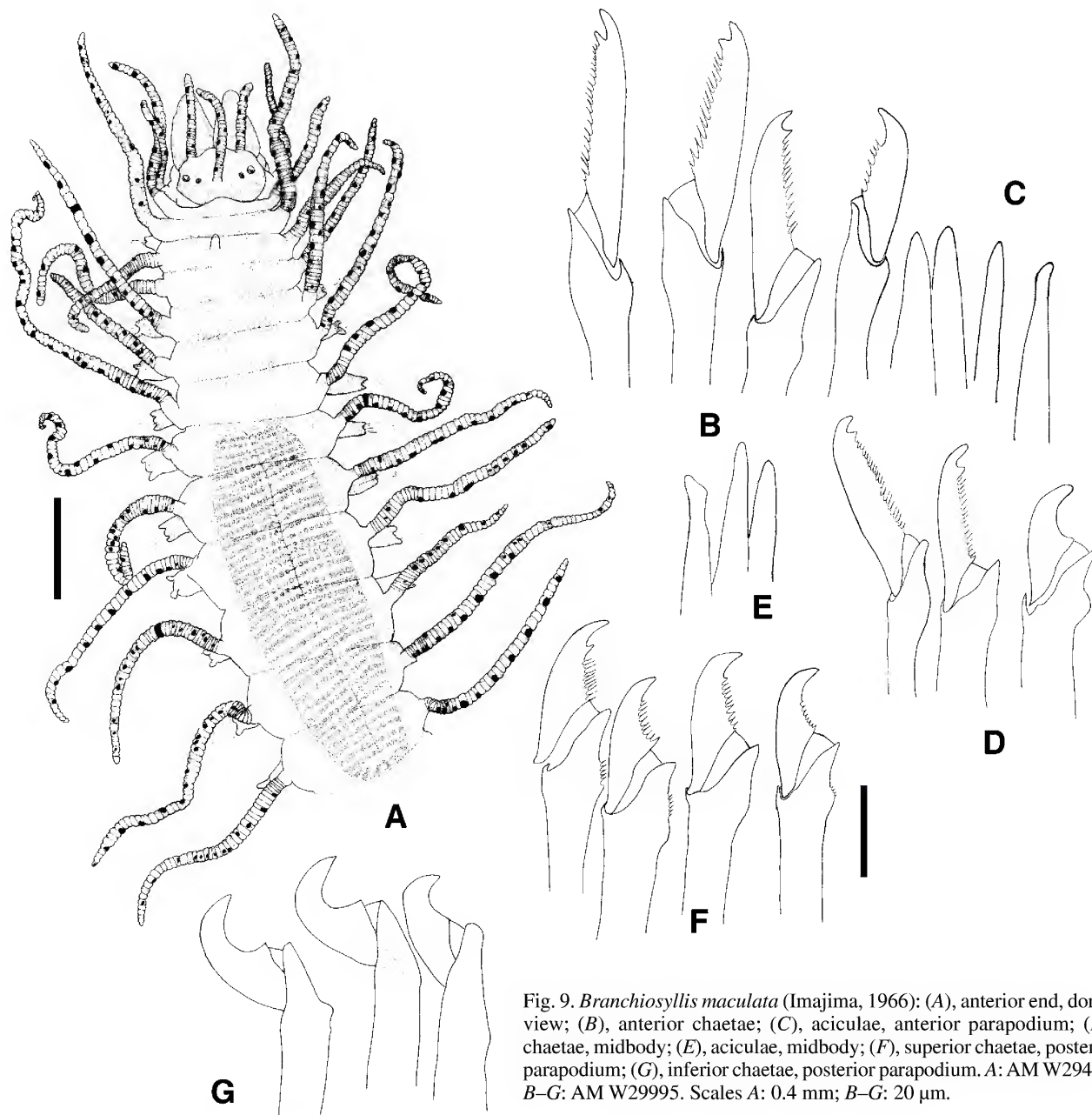


Fig. 9. *Branchiosyllis maculata* (Imajima, 1966): (A), anterior end, dorsal view; (B), anterior chaetae; (C), aciculae, anterior parapodium; (D), chaetae, midbody; (E), aciculae, midbody; (F), superior chaetae, posterior parapodium; (G), inferior chaetae, posterior parapodium. A: AM W29495. B–G: AM W29995. Scales A: 0.4 mm; B–G: 20  $\mu$ m.

***Branchiosyllis maculata* (Imajima, 1966)**

Figs 9A–G, 10C–F, 11A–F, 13A,B

*Typosyllis maculata* Imajima, 1966: 277, text-fig. 59 a–m.

*Branchiosyllis maculata* Licher, 1999: 274.–Aguado *et al.*, 2008; 10–13, figs 3–4

**Material examined.** Western Australia: inshore reef off Neds Camp, Cape Range National Park, 21°59'S 113°59'E, frilly *Caulerpa* sp., 1 m, coll. J.K. Lowry, 2 Jan. 1984, 4 (AM W30108); N end of beach, Bundegi Reef, Exmouth Gulf, 21°49'S 114°11'E, rocky rubble with sediment, brown alga with epiphytic growth, intertidal, coll. H.E. Stoddart, 4 Jan. 1984, 2 (AM W30109); N end of beach, Bundegi Reef, 21°49'S 114°11'E, rocky rubble & coralline algae with green epiphytes, 2 m, coll. H.E. Stoddart, 4 Jan. 1984, 4 (2 on SEM stub), (AM W30111); N end of beach, Bundegi Reef, 21°49'S 114°11'E, rocky rubble & brown alga with epiphytic growth, sticky sediment, 2 m, coll. H.E. Stoddart, 4 Jan. 1984, 3 (AM W29519); Goss Passage, Beacon Is., 28°25'30"S 113°47'E, dead plates of *Acropora* sp. covered in coralline algae, 8 m, coll. P.A. Hutchings, 19 May 1994, 3 (AM W30110).

**Description.** Largest specimen examined 11 mm long, 0.6 mm wide, with 62 chaetigers, plus an attached stolon, 0.7 mm long, with 10 chaetigers. Body cylindrical dorsally (Figs 9A, 10C). Dorsum of posterior segments with single transverse narrow band of black pigment, black spots on numerous articles of dorsal cirri; antennae, tentacular cirri and dorsal cirri of anterior segments typically without or with few spots (Fig. 9A); segments posterior to proventricular segments with some articles of dorsal cirri partially or totally black, usually 2–3 articles without pigment alternating with 1 pigmented; ventrum with scattered, black dots. Prostomium rounded; 4 eyes in open trapezoidal arrangement, almost in line (Fig. 9A). Median antenna similar in length or slightly shorter than combined length of prostomium and palps, inserted between posterior eyes, with about 27 articles. Lateral antennae inserted on anterior margin of prostomium, shorter than median antenna, with 18–22 articles. Palps similar in length to prostomium or slightly longer. Nuchal organs not



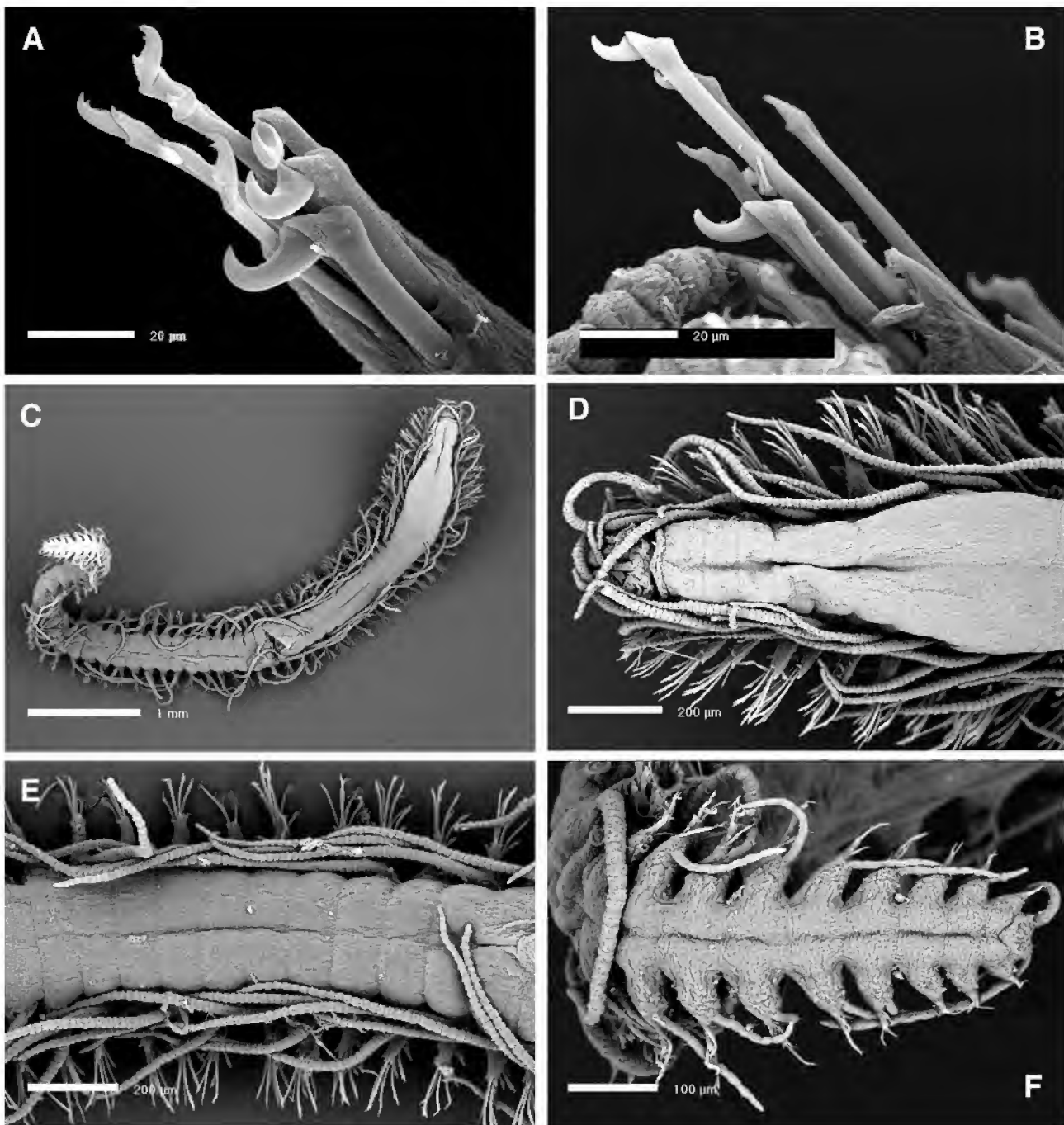


Fig. 10. SEM of *Branchiosyllis cirropunctata* (Michel, 1900): (A), midbody chaetal fascicle; (B), posterior chaetal fascicle. SEM of *Branchiosyllis maculata* (Imajima, 1966): (C), complete specimen, dorsal view, with stolon; (D), anterior end, dorsal view; (E), midbody, dorsal view; (F), stolon, dorsal view. A–B: AM W30093, C–F: AM W30111.

observed. Peristomium shorter than subsequent segments, with small anterior lobe (Figs 9A, 10D); dorsal tentacular cirri longer than median antenna, with about 15 articles, ventral ones shorter than dorsal tentacular cirri, with 9–10 articles. Dorsal cirri provided with distinct cirrophores. Dorsal cirri of chaetiger 1 long, with 50–55 articles; subsequent dorsal cirri alternating (Fig. 10D) long and short, with up to 47 and 35 articles respectively at midbody (Figs 9A, 10E). Parapodial lobes distally bilobed, prechaetal and postchaetal lobes digitiform (Figs 9A, 11D,E), unequal in length and shape. Ventral cirri digitiform, similar in length to parapodial lobes. Anterior parapodia with 9–10 compound

heterogomph falcigers, bidentate (Figs 9B, 11B,C), with short spines on margin, blades 41–42 µm above, 26 µm below. In more posterior parapodia, shafts developing larger protruberances (Figs 11E, 13A,B), more marked on ventral than dorsal chaetae, with short, smooth margin, unidentate. In posterior parapodia (Fig. 9F,G), blade of ventralmost 3–4 falcigers rotated 180°, becoming claw-shaped, with distinctly shorter shafts than those of normal straight falcigers; remaining 5–6 falcigers with shafts with short subdistal spurs and hooked blades, unidentate or slightly bidentate (Fig. 11F), about 30–35 µm long. Anterior parapodia each with 3–4 slender aciculae, all straight, pointed (Fig. 9C) except

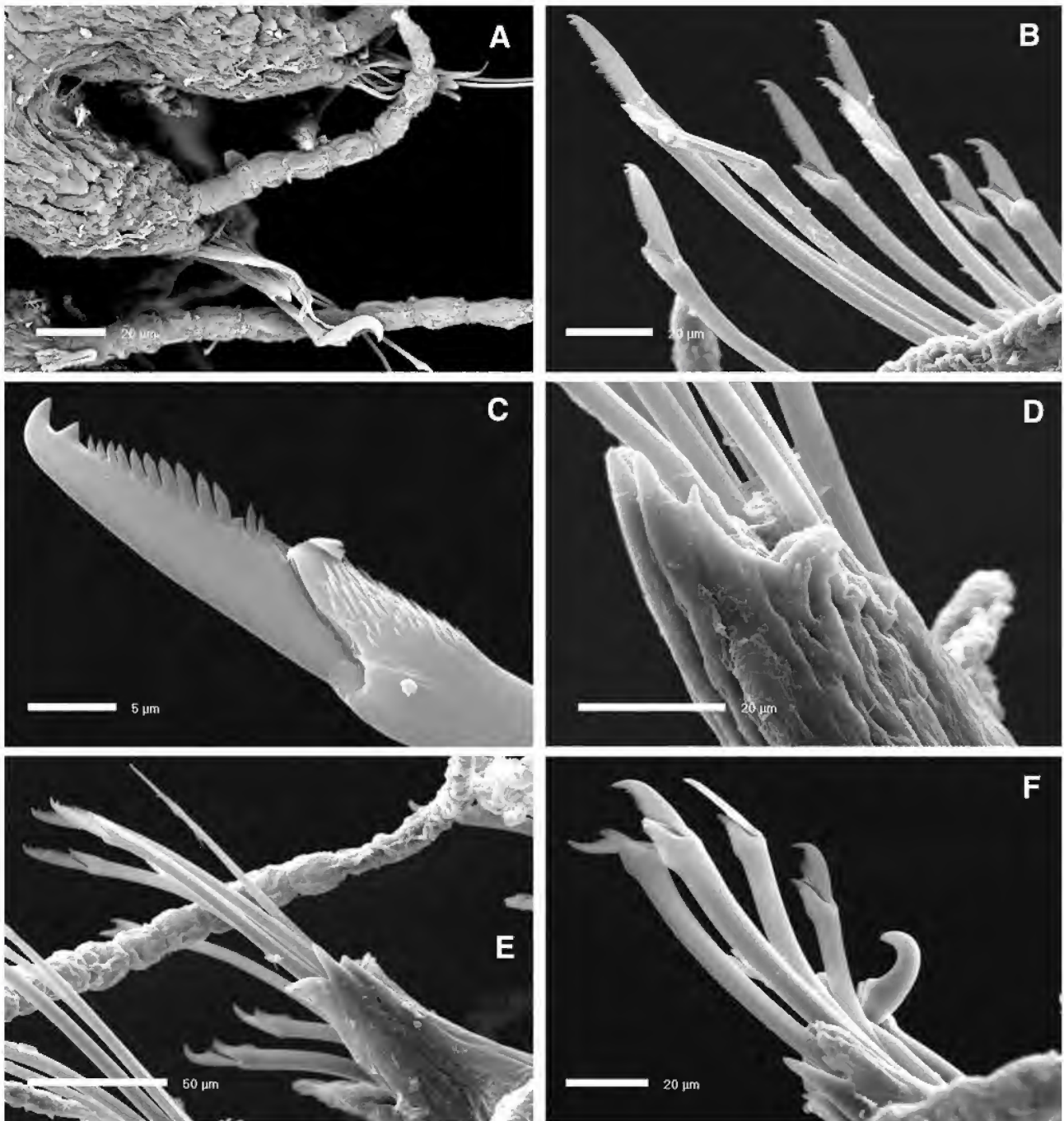


Fig. 11. SEM of *Branchiosyllis maculata* (Imajima, 1966): (A), detail of parapodium of stolon; (B), anterior chaetal fascicle; (C), anterior chaeta; (D), disal end of an anterior parapodial lobe, with emerging aciculae; (E), midbody chaetal fascicle; (F), anterior chaetal fascicle. A–F: AM W30111.

one slightly oblique at tip; from midbody posteriorly, number of aciculae per parapodium decreasing to 2 (Fig. 9E), one straight, pointed, slightly protruding from parapodial lobes, other slightly oblique at tip (Fig. 11E). Pharynx through 6–7 segments; pharyngeal tooth located anteriorly (Fig. 9A), surrounded by crown of 10 soft papillae. Proventricle similar in length to pharynx, present through 6 segments, with 40–42 muscle cell rows, and distinct mid-dorsal line. Pygidium small, with 2 anal cirri similar in length to dorsal cirri. Some specimens with attached acephalous stolon, small, short, with 8–10 chaetigers (Figs 10F, 11A).

**Remarks.** The claw-shaped falcigerous chaetae, typical of the genus *Branchiosyllis*, are difficult to observe in dorsal view, since they have short shafts, and in other views they may appear absent. This species is very similar to *B. cirropunctata* but the latter has all the posterior chaetae claw-shaped, with stouter subdistal spurs on shafts.

**Habitat.** Intertidal to shallow depths, in amongst coral rubble and algae.

**Distribution.** Japan (southern), Australia (Central Western Australia).



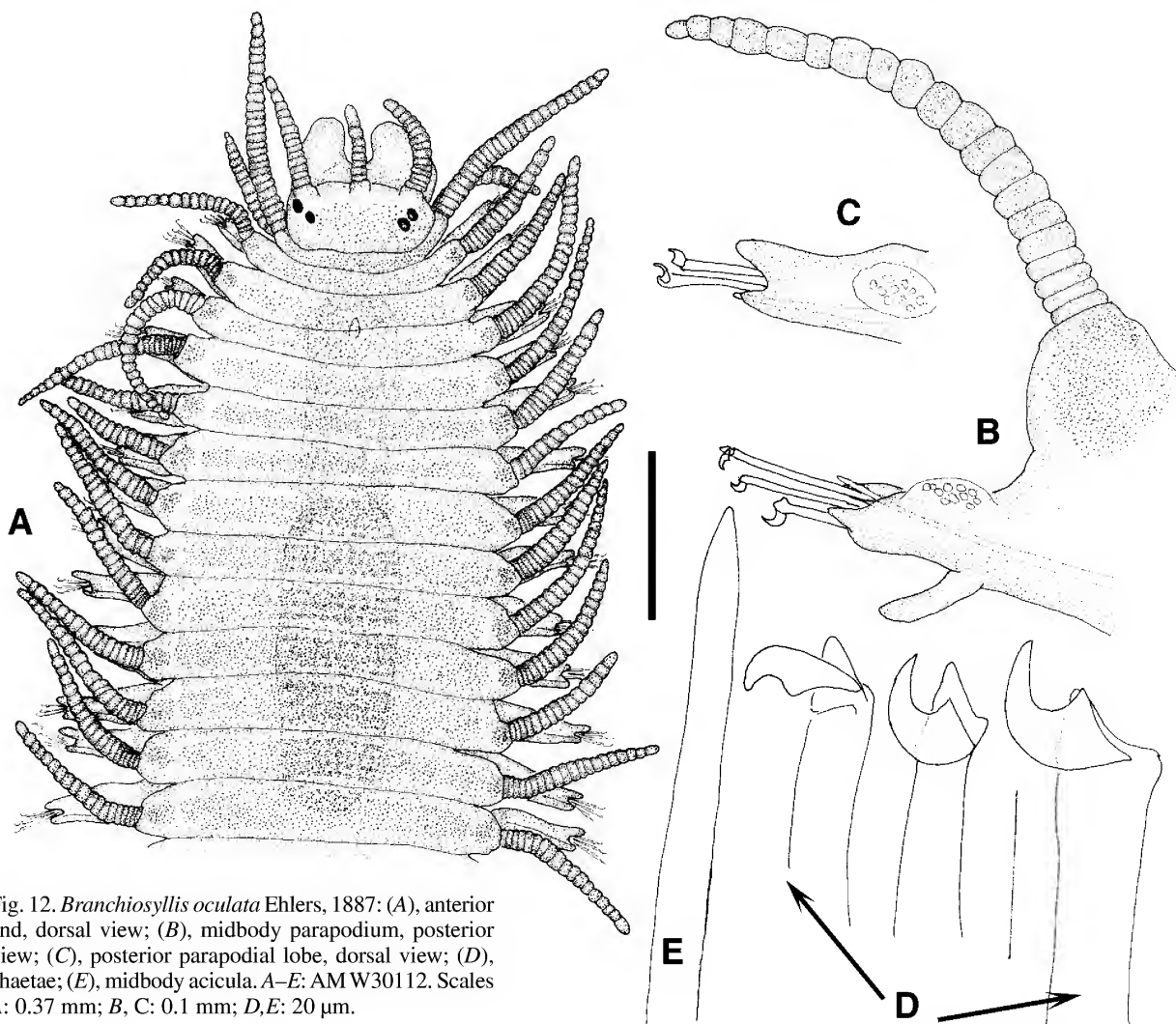


Fig. 12. *Branchiosyllis oculata* Ehlers, 1887: (A), anterior end, dorsal view; (B), midbody parapodium, posterior view; (C), posterior parapodial lobe, dorsal view; (D), chaetae; (E), midbody acicula. A–E: AM W30112. Scales A: 0.37 mm; B, C: 0.1 mm; D, E: 20  $\mu$ m.

### *Branchiosyllis oculata* Ehlers, 1887

Figs 12A–E, 13C–F, 15A

*Branchiosyllis oculata* Ehlers, 1887: 148, pl. 39, figs 1–7.–Rioja, 1958: 240, fig. 7.–Uebelacker, 1984: 30–107, fig. 30–102.–San Martín, 1991: 233.

*Branchiosyllis pacifica australis* Hartmann-Schröder, 1981: 23, figs 14–18.

**Material examined. Western Australia:** Kimberley region; reef S of Lucas Is., Brunswick Bay, 15°16'S 124°29'E, dead coral & *Sargassum* with heavy silt loading, 2 m, coll. P.A. Hutchings, 24 July 1988, 1 (AM W30112); SW corner of Lucas Is., 15°13'S 124°31'E, coral rubble, 2–30 m, coll. P.A. Hutchings, 24 July 1988, 2 (AM W30113); Bernouli Is., 15°S 124°47'E, sand with coral rubble, 1 m, coll. P.A. Hutchings, 12 July 1988, 8 (1 on SEM stub) (AM W30114).

**Additional material examined.** *Branchiosyllis oculata* NFMN 6745, 1 syntype, Key West, Florida, USA. *Branchiosyllis pacifica australis* HZM P-16474 (holotype), and HZM P-16475 (1 paratype), Exmouth, Tantabiddy Creek, Western Australia.

**Description.** Body long, strongly dorsoventrally flattened, ribbon-like (Figs 12A, 13C,D), longest examined specimen about 100 mm long, 0.8 mm wide, with 92 chaetigers plus developing sexual acephalous stolon of 11 chaetigers. Some specimens dark brown, with lighter areas, others colourless in alcohol. Prostomium oval; 4 small eyes in open trapezoidal arrangement. Antennae inserted near anterior margin

of prostomium (Figs 12A, 13D), proportionally short, with about 14 articles (Figs 12A, 13D), all similar in length. Palps similar in length to prostomium. Nuchal organs not observed. Peristomium shorter than subsequent segments; dorsal tentacular cirri distinctly longer than antennae, with about 26 articles; ventral tentacular cirri about  $\frac{2}{3}$  length of dorsal ones, with about 14 articles (Figs 12A, 13D). Parapodia elongate, distally bilobed, with prechaetal lobe longer than postchaetal lobe (Figs 12B,C, 13E); rounded, dome-shaped branchia dorsally located on parapodial lobe (Figs 12B,C, 13E,F, arrows), with granular appearance. Dorsal cirri with distinct, usually dark cirrophores (Fig. 12B), and 20–23 articles on midbody, alternating in length, but all shorter than body width. Ventral cirri digitiform, elongated, inserted near middle of parapodial lobe. All compound falcigers claw-shaped, with smooth, unidentate blades of varying sizes on each parapodium (Figs 12D, 13E, 15A); anterior parapodium with 4–6 compound chaetae, decreasing to 3 on midbody and posterior parapodia. Anterior parapodia with 2 aciculae, from proventricular segments onwards solitary acicula, straight, distally pointed (Fig. 12B,E), protruding from parapodial lobes (Figs 13E, 15A). Pharynx through about 6 segments; pharyngeal tooth on anterior margin. Proventricle rectangular, through 6–7 segments, with 26–30 muscle cell rows. Pygidium small, with 2 anal cirri similar to dorsal cirri.

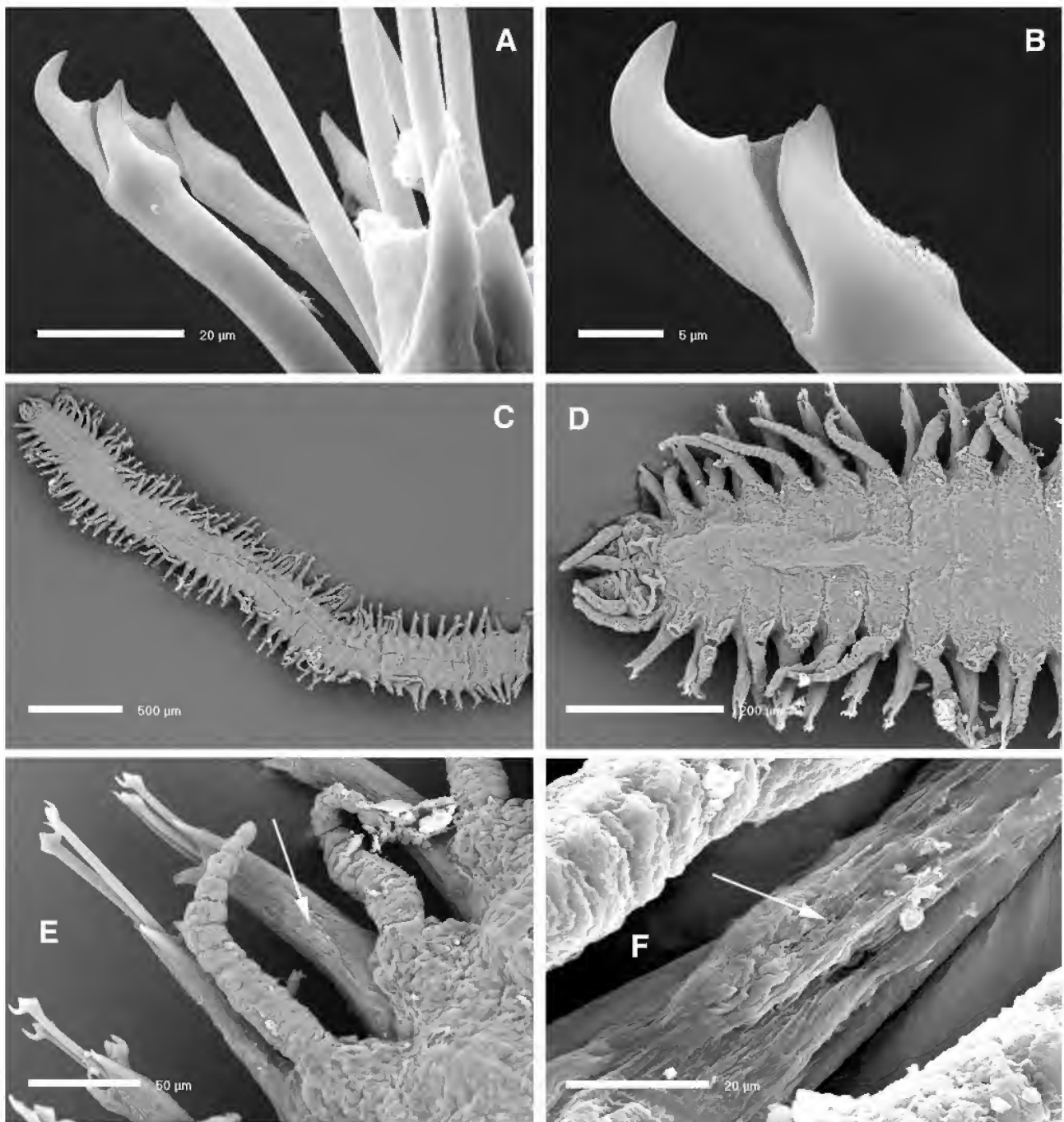


Fig. 13. SEM of *Branchiosyllis maculata* (Imajima, 1966): (A), ventral midbody chaetae and emerging aciculae; (B), ventral chaeta, midbody. SEM of *Branchiosyllis oculata* Ehlers, 1887: (C), complete specimen, dorsal view; (D), anterior end, dorsal view; (E), midbody parapodia, dorsal view; (F), detail of branchia. A–B: AM W30111; C–F: AM W30114.

**Remarks.** *Branchiosyllis oculata* is the type species of the genus, and was described from material collected in Florida, and has been widely reported from the Gulf of México and Caribbean region, from Cuba to Venezuela. The specimens from Western Australia agree with the description of this species and resemble the syntypes and specimens from Cuba and Venezuela, which have been examined, although the branchiae are smaller and less distinct in Australian specimens. This species belongs to the group of species with branchiae and all claw-shaped falcigers, with blades rotated 180°. *Branchiosyllis pacifica* Rioja, 1941, known from the Pacific coast of America, between México and Panamá also

belongs to this group (see Rioja, 1941, Capa *et al.*, 2001 a); in this species, the branchiae are better developed being either bi- or tri-lobed than in the type species. *Branchiosyllis pacifica australis* Hartmann-Schröder, 1981, described from Western Australia agrees with *Branchiosyllis oculata*, although the original description omitted mention of the presence of branchiae; however these are small and easily overlooked. Both, holotype and paratype of this subspecies are very small specimens, probably juveniles, and may lack branchiae or they are small and indistinct and we have therefore synonymized this subspecies with *Branchiosyllis oculata*.



**Habitat.** Shallow water in sand and coral rubble, algae and encrusting algae in surf zone.

**Distribution.** Gulf of México and Caribbean Sea, Australia (North Western Australia).

***Branchiosyllis orbiniiformis* n.sp.**

Figs 14A–C, 15B–F

**Material examined.** HOLOTYPE (AM W30115), PARATYPES, 2 (AM W30116), **Western Australia:** Kimberley region, reef S of Lucas Is., Brunswick Bay, 15°16'S 124°29'E, dead coral & *Sargassum* with heavy silt loading, 2 m, coll. P.A. Hutchings, 24 July 1988; Bernouli Is., 15°S 124°47'E, sand with coral rubble, intertidal, coll. P.A. Hutchings, 12 July 1988, 2 (AM W30117); SW corner of Lucas Is., 15°13'S 124°31'E, dead coral rubble & silt, 2–30 m, coll. P.A. Hutchings, 24 July 1988, 2 (1 on SEM stub) (AM W26512).

**Description.** Body distinctly compressed laterally, with cirri and parapodia dorsally directed (Figs 14A, 15B–D); usually colourless, but some specimens with 1–2 dark spots on cirrophores; one specimen with black spots on dorsum as well. Holotype 3.6 mm long, 0.48 mm wide, with 38 chaetigers; longest paratype 5 mm long, with 57 chaetigers. Prostomium small, oval; 4 small eyes in open trapezoidal arrangement. Median antenna inserted in front of anterior eyes, with about 13–14 articles, slightly shorter than combined length of prostomium and palps; lateral antennae shorter than median antenna, with about 10 articles, inserted near anterior margin of prostomium. Nuchal organs not observed. Peristomium shorter than subsequent segments, dorsally reduced, covered by chaetiger 1; dorsal tentacular cirri longer than antennae, with about 17–19 articles; ventral tentacular cirri approximately half of length of dorsal ones, with about 8 articles. Parapodia directed dorsally, elongated, extending beyond dorsum (Figs 14A, 15A–D); in lateral view, dorsal cirri dorsally directed, longer than width of anterior segments, with about 11–16 articles, irregular in length, some segments with unequal dorsal cirri, becoming shorter from midbody (Fig. 14A). Parapodial lobes elongate, distally blunt, without branchiae (Fig. 15C,D). Ventral cirri distinctly short, papilliform (Fig. 14A). Aciculae strong basally, distally pointed (Figs 14A,C, 15E), supporting parapodial lobes dorsally directed; 2 aciculae in anterior parapodia, single in remaining segments. All parapodia with 3 compound falciger, blades unidentate, marginally smooth, claw-shaped, with blades turned 180° (Figs 14B, 15E,F); dorsal falcigers with slender shafts and short blades, becoming thicker ventrally, with larger blades. Pharynx through 6–7 segments; pharyngeal tooth anteriorly located (Fig. 14A). Proventricle barrel-shaped, through 6 segments, with 24–27 muscle cell rows. Pygidium small, with 2 anal cirri, similar to dorsal ones.

**Remarks.** *Branchiosyllis orbiniiformis* n.sp., is unique among all syllids in having a combination of distinctly laterally compressed body, with parapodia, chaetae and dorsal cirri all dorsally directed. Specimens of this species superficially look

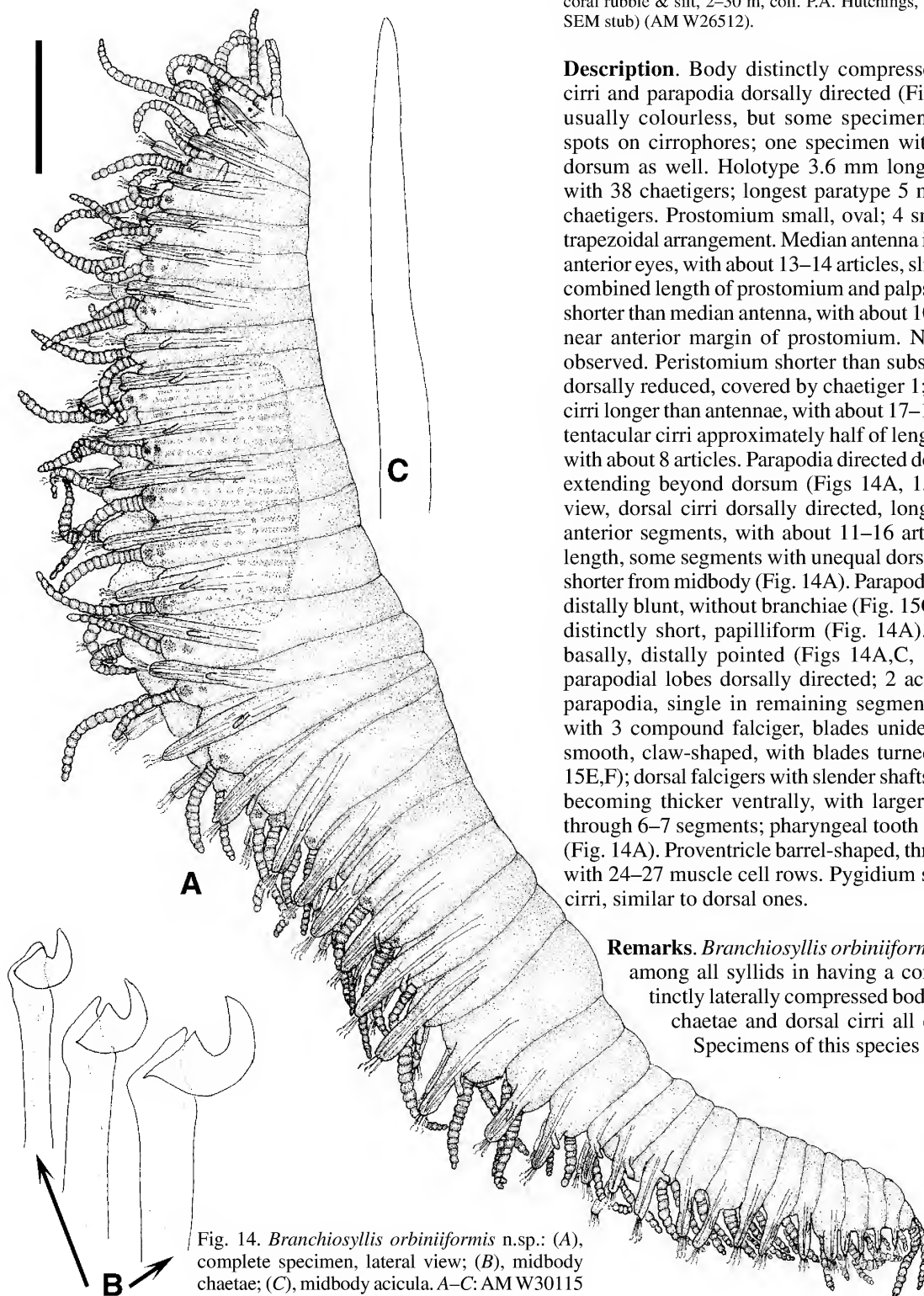


Fig. 14. *Branchiosyllis orbiniiformis* n.sp.: (A), complete specimen, lateral view; (B), midbody chaetae; (C), midbody acicula. A–C: AM W30115 (holotype). Scales A: 0.1 mm; B, C: 20  $\mu$ m.

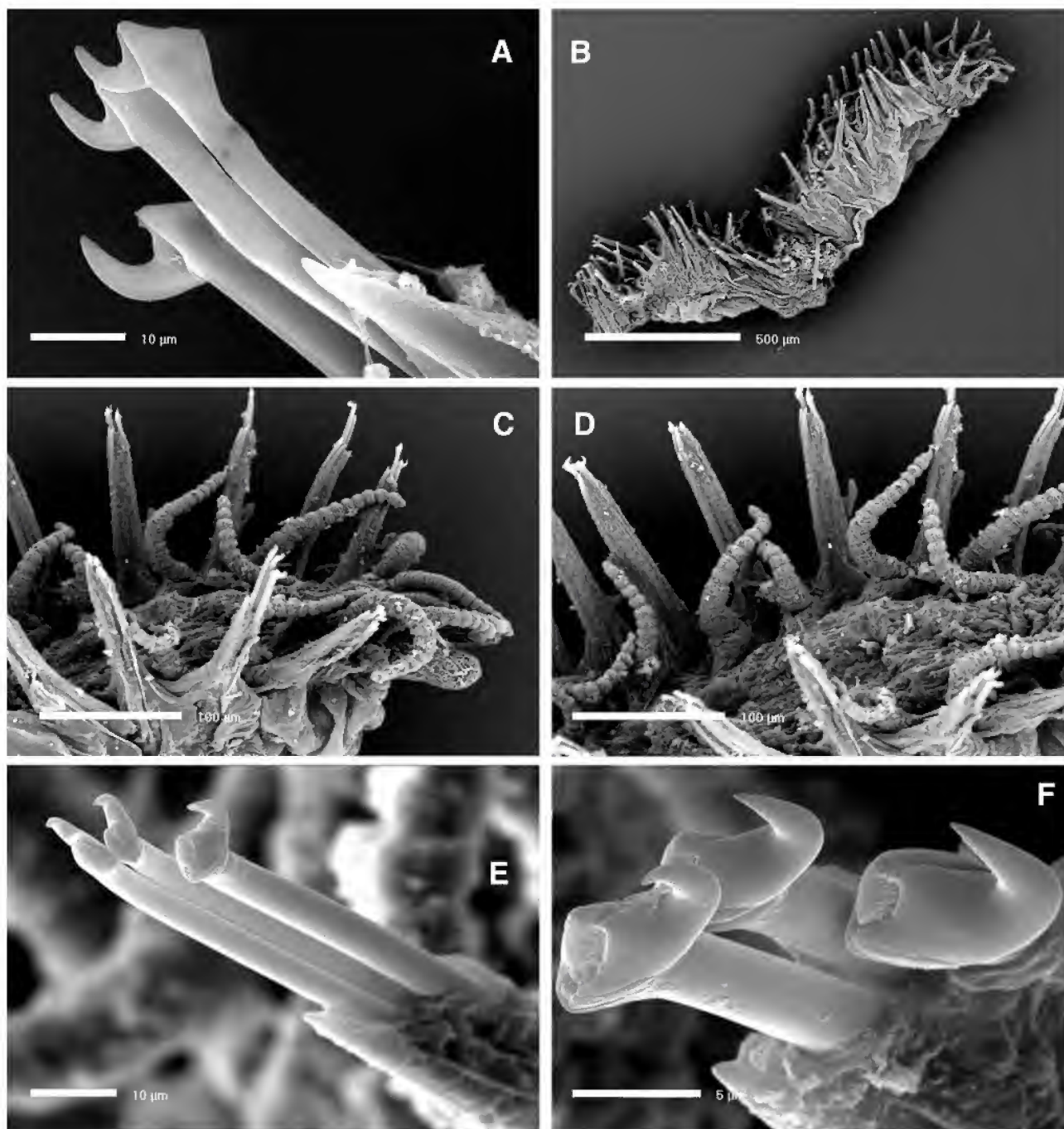


Fig. 15. SEM of *Branchiosyllis oculata* Ehlers, 1887: (A), chaetae and emerging acicula. SEM of *Branchiosyllis orbiniiformis* n.sp.: (B), complete specimen; (C), anterior end, laterodorsal view; (D), midbody, dorsal view; (E,F), anterior chaetae. A: AM W30114; B–F: AM W26512.

like a small orbiniid, but a more detailed examination reveals their familial association. The compound chaetae are typical of the genus *Branchiosyllis*.

**Etymology.** The specific name refers to the superficial resemblance between members of this species and members of the family Orbiniidae (Polychaeta).

**Habitat.** Occurs in 2–30 m, in dead coral substrate often heavily loaded with silt and *Sargassum*.

**Distribution.** Australia (North Western Australia).

### *Branchiosyllis thylacine* n.sp.

Fig. 16A–G

**Material examined.** HOLOTYPE (AM W30120), PARATYPES 2 (AM W30121), **New South Wales:** 50 m west of Split Solitary Is., 30°14'S 153°10'48"E, *Herdmania momus*, rocks, sponges and ascidians, 16 m, coll. P.A. Hutchings & C.L. Rose, 7 Mar. 1992; N side of Bannister Head, 35°19'09"S 150°29'07"E, grey sponge from top of boulder, 18 m, coll. K. Attwood, 6 May 1997, 1 (AM W30122); Manta Reef, North West Solitary Is., 30°01'30"S 153°16'30"E, lace bryozoan, 19 m, coll. R.T. Springthorpe, 25 June 1992, 2 (AM W30123).



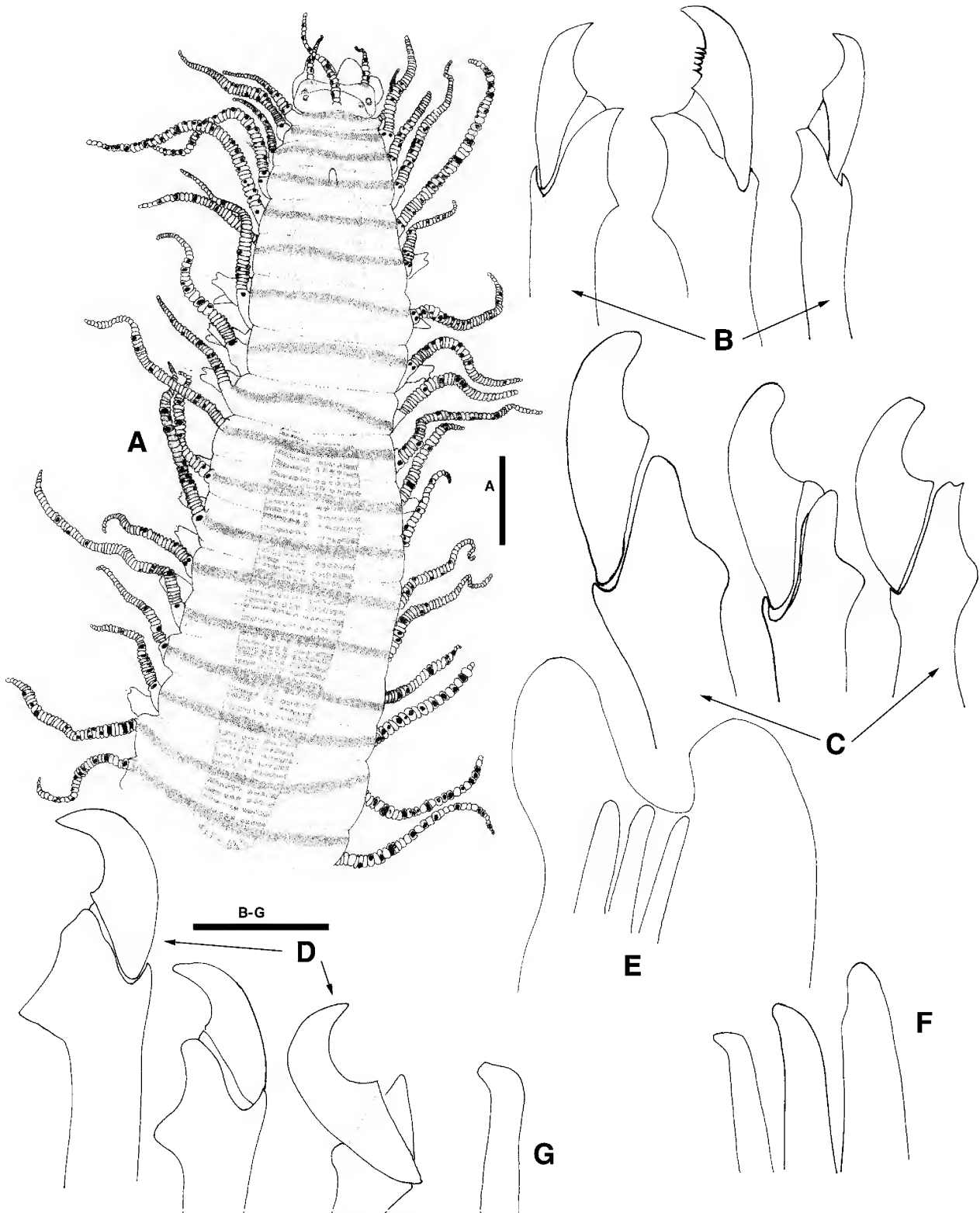


Fig. 16. *Branchiosyllis thylacine* n.sp.: (A), anterior end, dorsal view; (B), anterior chaetae; (C), midbody chaetae; (D), posterior chaetae; (E), midbody aciculae, with distal end of parapodial lobe; (F), anterior aciculae; (G), posterior acicula. A–G: AM W30120 (holotype). Scales A: 0.4 mm; B–G: 2  $\mu$ m.

**Description.** Longest specimen examined 18 mm long, 1 mm wide, with 87 chaetigers, plus an attached stolon, 23 mm long, with 16 chaetigers; holotype 18 mm long, 1.52 mm wide, with about 100 chaetigers. Body cylindrical dorsally. Dorsum of each segment with single transverse

band of black pigment, black spots on numerous articles of dorsal cirri (Fig. 16A); ventrum with scattered, black dots. Prostomium rectangular, slightly bilobed; 4 eyes on trapezoidal arrangement, with shallow transverse furrow and 2 anterior pigmented lines (Fig. 16A). Median antenna

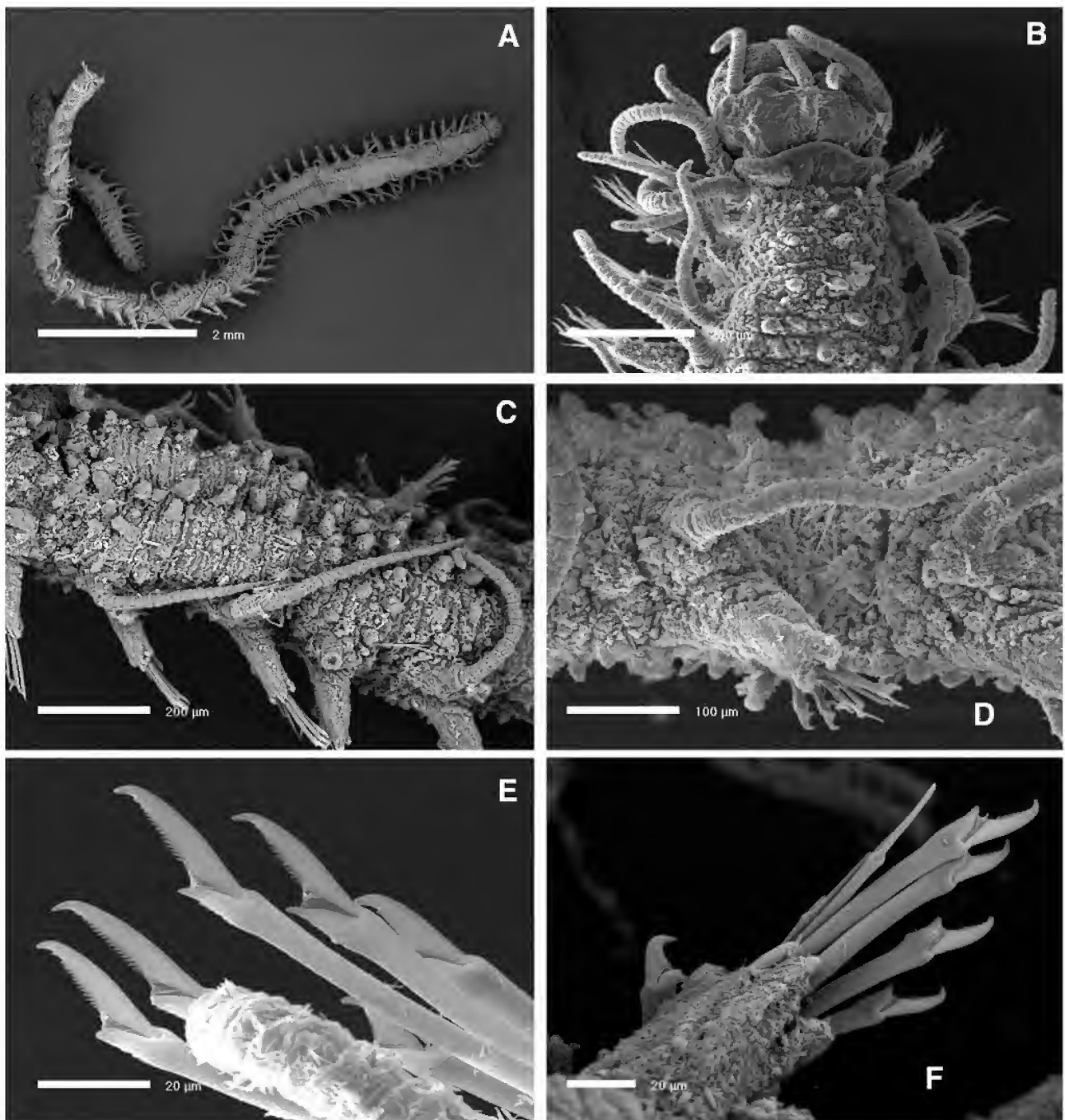


Fig. 17. SEM of *Branchiosyllis verruculosa* (Augener, 1913): (A), complete specimen (2 pieces), dorsal view; (B), anterior end, dorsal view; (C), midbody, dorsal view; (D), midbody parapodium; (E), anterior chaetal fascicle; (F), midbody chaetal fascicle, with emergent acicula. A–F: AM W30130.

slightly longer than combined length of prostomium and palps, inserted between posterior eyes, with 20–28 articles; lateral antennae inserted on anterior margin of prostomium, shorter than median antenna, with 13–18 articles. Palps similar in length to prostomium, wider basally, slightly bilobed. Nuchal organs not observed. Peristomium shorter than subsequent segments (Fig. 16A); dorsal tentacular cirri longer than median antenna, with 30–33 articles, ventral ones shorter than dorsal tentacular cirri, with 13–18 articles. Dorsal cirri with distinct, long cirrophore, pigmented black, often with single large black spot near cirrophore. Dorsal cirri of chaetiger 1 long, with 40–50 articles; subsequent dorsal

cirri alternating long and short (Fig. 16A), with up to 40 and 30 articles respectively, 29–42 on midbody. Parapodial lobes distally bilobed, prechaetal and postchaetal lobes digitiform, dissimilar in length (Fig. 16A,E). Ventral cirri digitiform, shorter than parapodial lobes. Usually 3 compound heterogomph chaetae on anterior parapodia (occasionally up to 5), blades falcigerous, unidentate, with short spines on margin or totally smooth (Fig. 16B), blades 27–28  $\mu\text{m}$  above, 21  $\mu\text{m}$  below. In more posterior parapodia, shafts becoming larger, with marked subdistal spurs, especially on ventral chaetae (Fig. 16C); on far posterior parapodia, blades of ventralmost chaetae rotated 180°, becoming claw-shaped; remaining



two falcigers with markedly larger shafts with subdistal spurs, and hooked blades (Fig. 16D), about 28–29 µm long. Anterior parapodia each with 3 slender aciculae (Fig. 16E), 1 straight and others slightly oblique at tip (Fig. 16F); from midbody posteriorly, number of aciculae per parapodium decreasing, posterior parapodia with single aciculum, slightly oblique at tip (Fig. 16G). Pharynx through about 7 segments; pharyngeal tooth located anteriorly, surrounded by crown of 10 soft papillae. Proventricle longer than pharynx, through 9 segments, with about 40–50 muscle cell rows. Pygidium small, with 2 anal cirri similar to dorsal cirri. Two specimens with attached acephalous stolon.

**Remarks.** Haswell (1886) described, a species with similar colour pattern from New South Wales, *Gnathosyllis zonata* Haswell, 1886, considered by Licher (1999), perhaps erroneously, as a synonym of *Syllis prolifera* Khron, 1852. However, descriptions of Australian material of that species by Haswell (1886) and Augener (1913) differ from this new species in having distinctly bidentate chaetae and, apparently, lacking claw-shaped chaetae. Haswell's original description was based on a single, incomplete specimen, so the posterior chaetae were not described; and he noted that up to 10 chaetae were present per parapodium, whereas our species has only five. The type of *G. zonata* cannot be located and is presumed lost.

**Etymology.** The species is named after the Tasmanian wolf, also known as Tasmanian tiger, *Thylacinus cynocephalus*, a carnivorous marsupial, which also has stripes on its back. Used as a noun in apposition.

**Habitat.** Found in depths of 16–19 m in amongst sponges, ascidians or bryozoans.

**Distribution.** Australia (New South Wales).

### *Branchiosyllis verruculosa* (Augener, 1913)

Figs 17A–F, 18A–F, 19A–D

*Syllis* (*Typosyllis*) *verruculosa* Augener, 1913: 203, text-fig.

24a–c, pl. 3, fig. 39.—Day & Hutchings, 1979: 104.

*Syllis verruculosa* Monro, 1939: 29, text-fig. 298.

*Branchiosyllis verruculosa* Licher, 1999: 274.—Aguado *et al.*, 2008: 13, fig. 5.

**Material examined. Western Australia:** inshore reef off Neds Camp, Cape Range National Park, 21°59'S 113°59'E, in *Caulerpa* sp., intertidal, coll. J.K. Lowry, 2 Jan. 1984, 1 (AM W30124); Goss Passage, Beacon Is., 28°25'30"S 113°47'E, dead plates of *Acropora* sp. covered in coralline algae, 20 m, coll. P.A. Hutchings, 20 May 1994, 1 (AM W30125); Goss Passage, Beacon Is., 28°25'30"S 113°47'E, dead plates of *Acropora* sp. covered in coralline algae & sponges, 32 m, coll. P.A. Hutchings, 19 May 1994, 1 (AM W30126); Goss Passage, Beacon Is., 28°25'30"S 113°47'E, dead plates of *Acropora* sp. covered in coralline algae, 8 m, coll. P.A. Hutchings, 22 May 1994, 1 (AM W30127); Goss Passage, Beacon Is., 28°25'30"S 113°47'E, dead coral substrate embedded in fine sediment, 33 m, coll. P.A. Hutchings, 23 May 1994, 1 (on SEM stub), (AM W30130); E side of West Wallabi Is., 28°27'54"S 113°40'54"E, in *Posidonia australis* root mat plus epifauna, 2 m, coll. P.A. Hutchings, 26 May 1994, 1 (AM W30128); SE end of Long Is., 28°28'48"S 113°46'30"E, dead coral substrate embedded in calcareous substrate, 30 m, coll. P.A. Hutchings, 22 May 1994, 2 (AM W30129). **South Australia:** Billy Lights Point, Port Lincoln, 34°45'S 135°53'E, stone washings from sheltered intertidal rocks, coll. I. Loch, 15 Feb. 1985, 1 (AM W30131). **Queensland:** Triangular Islets, Shoalwater Bay, 22°23'S 150°30'E, coll. J.A. Lewis & J.R. Forsyth, 1981, 3 (AM W202642).

**Additional material examined. Western Australia:** Shark Bay, 25°30'S 113°40'E, 3–8 m, ZMB5296, 7 syntypes; ZMB 5297, 4 syntypes.

**Description.** Longest specimen examined 19 mm long, 0.6 mm wide, with 78 chaetigers plus small sexual acephalous stolon of few chaetigers. Body cylindrical in dorsal view (Figs 17A, 18A). Dorsum with irregular black pigment, forming transverse bands on some anterior segments (Fig. 18A); most of specimens with few, scattered papillae present laterally on each segment, more densely distributed posterior to proventricle (Figs 17A–D, 18A); large specimens with distinct papillae from anterior segments onwards, and papillae also on ventrum. Prostomium oval, large (Figs 17B, 18A), 4 black eyes in open trapezoidal arrangement, anterior and posterior ones on each side nearly vertically aligned (Fig. 18A). Median antenna slightly shorter than combined length of prostomium and palps, inserted in front of line between anterior eyes, with 16–17 articles; lateral antennae inserted near anterior margin of prostomium, shorter than median antenna, with 14–16 articles. Palps similar in length to prostomium or shorter. Nuchal organs not observed. Peristomium shorter than subsequent segments (Figs 17B, 18A); dorsal tentacular cirri longer than median antenna, ventral ones shorter than dorsal tentacular cirri. Dorsal cirri of chaetiger 1 long, with about 37 articles; those of chaetigers 2 and 3 shorter, with about 15 and 19 articles respectively, dorsal cirri of chaetiger 4 long, with about 34 articles; remaining dorsal cirri alternating long and short, with 17–20 and 11–14 articles respectively. Parapodial lobes conical, distally bilobed, prechaetal and postchaetal lobes dissimilar (Fig. 18A). Ventral cirri digitiform, shorter than parapodial lobes. Anterior parapodia with 5–6 compound heterogomph chaetae, blades falcigerous, unidentate or minutely bidentate (Figs 17E, 18B), with short spines on margin on dorsal chaetae to smooth on ventral ones, blades 27 µm above, 17–18 µm below. In midbody, 5–6 compound chaetae per parapodium, similar to anterior ones, but shorter, hooked, and smooth (Figs 17F, 18D). Some blades becoming claw-shaped posteriorly, with blades rotated 180°; number of claw-shaped falcigers increasing and non-modified falcigers decreasing posteriorly (Fig. 19A,B); posterior parapodia with 4–5 claw-shaped falcigers, all similar or differing slightly in size (Figs 17C,D, 18E, 19C,D). Anterior parapodia each with 2 slender aciculae, 1 straight and other slightly oblique at tip (Fig. 18C); from midbody onwards, single acicula per parapodium, thicker than anterior ones, slightly oblique at tip (Fig. 18F), protruding from parapodial lobes (Fig. 17F). Pharynx through 5–6 segments; pharyngeal tooth located anteriorly (Fig. 18A). Proventricle similar in length to pharynx, through 5–7 segments, with about 30 muscle cell rows. Pygidium small, with 2 anal cirri similar to dorsal cirri.

**Remarks.** *Branchiosyllis verruculosa* is similar to *B. exilis*, but differs in having all chaetae unidentate or minutely bidentate anteriorly, and with some papillae present on the dorsum. This is the only species of the genus described with papillated dorsum. The studied material agrees well with the types and previous description as well as the Indonesian specimens.

**Habitat.** Occurs from intertidal to 33 m, under rocks intertidally or associated with dead coral substrate covered in coralline algae.

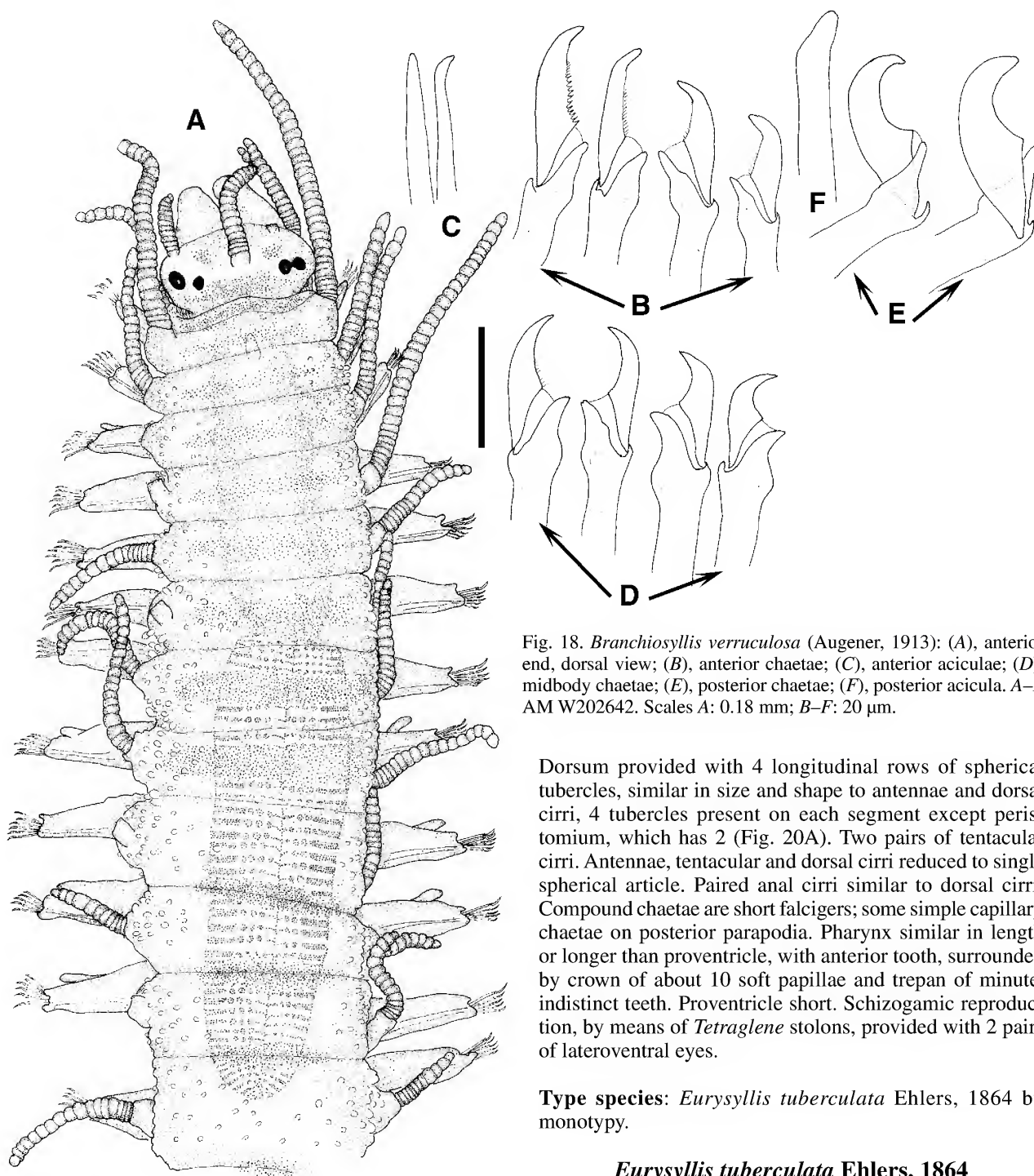


Fig. 18. *Branchiosyllis verruculosa* (Augener, 1913): (A), anterior end, dorsal view; (B), anterior chaetae; (C), anterior aciculae; (D), midbody chaetae; (E), posterior chaetae; (F), posterior acicula. A–F AM W202642. Scales A: 0.18 mm; B–F: 20  $\mu$ m.

Dorsum provided with 4 longitudinal rows of spherical tubercles, similar in size and shape to antennae and dorsal cirri, 4 tubercles present on each segment except peristomium, which has 2 (Fig. 20A). Two pairs of tentacular cirri. Antennae, tentacular and dorsal cirri reduced to single spherical article. Paired anal cirri similar to dorsal cirri. Compound chaetae are short falcigers; some simple capillary chaetae on posterior parapodia. Pharynx similar in length or longer than proventricle, with anterior tooth, surrounded by crown of about 10 soft papillae and trepan of minute, indistinct teeth. Proventricle short. Schizogamic reproduction, by means of *Tetraglene* stolons, provided with 2 pairs of lateroventral eyes.

**Type species:** *Eurysyllis tuberculata* Ehlers, 1864 by monotypy.

### *Eurysyllis tuberculata* Ehlers, 1864

Fig. 20A–E

*Eurysyllis tuberculata* Ehlers, 1864: 264, figs 4–7.—Laubier, 1968: 94, figs 7, 8.—Hartmann-Schröder, 1982: 66; 1984: 21; 1987: 39; 1989: 27.—Uebelacker, 1984: 30–99, fig. 30–94.—San Martín, 2003: 296, figs 162–164.

**Material examined.** **Western Australia:** Kimberley region, reef S of Lucas Is., Brunswick Bay, 15°16'S 124°29'E, 24 July 1988, dead coral & *Sargassum* with heavy silt loading, 2 m, coll. P.A. Hutchings, 6 (on SEM stub) (AM W30132); Lafontaine Is., 14°10'S 125°47'E, found underneath dead coral colonies on muddy substrate, 9–15 m, coll. P.A. Hutchings, 19 July 1988, 1 (on SEM stub) (AM W30133); Bernouli Is., 15°S 124°47'E, underneath rocks, intertidal, coll. P.A. Hutchings, 12 July 1988, 1 (AM

**Distribution.** Australia (Central Western Australia, South Australia, Queensland), Indonesia.

### Genus *Eurysyllis* Ehlers, 1864

*Eurysyllis* Ehlers, 1864: 264.

**Diagnosis.** Body small, oval, elongated, strongly flattened dorsoventrally. Prostomium with 2 pairs of eyes, 3 antennae and 2 spherical palps. Antennae inserted on anterior margin of prostomium; palps inserted ventrally, fused to each other.



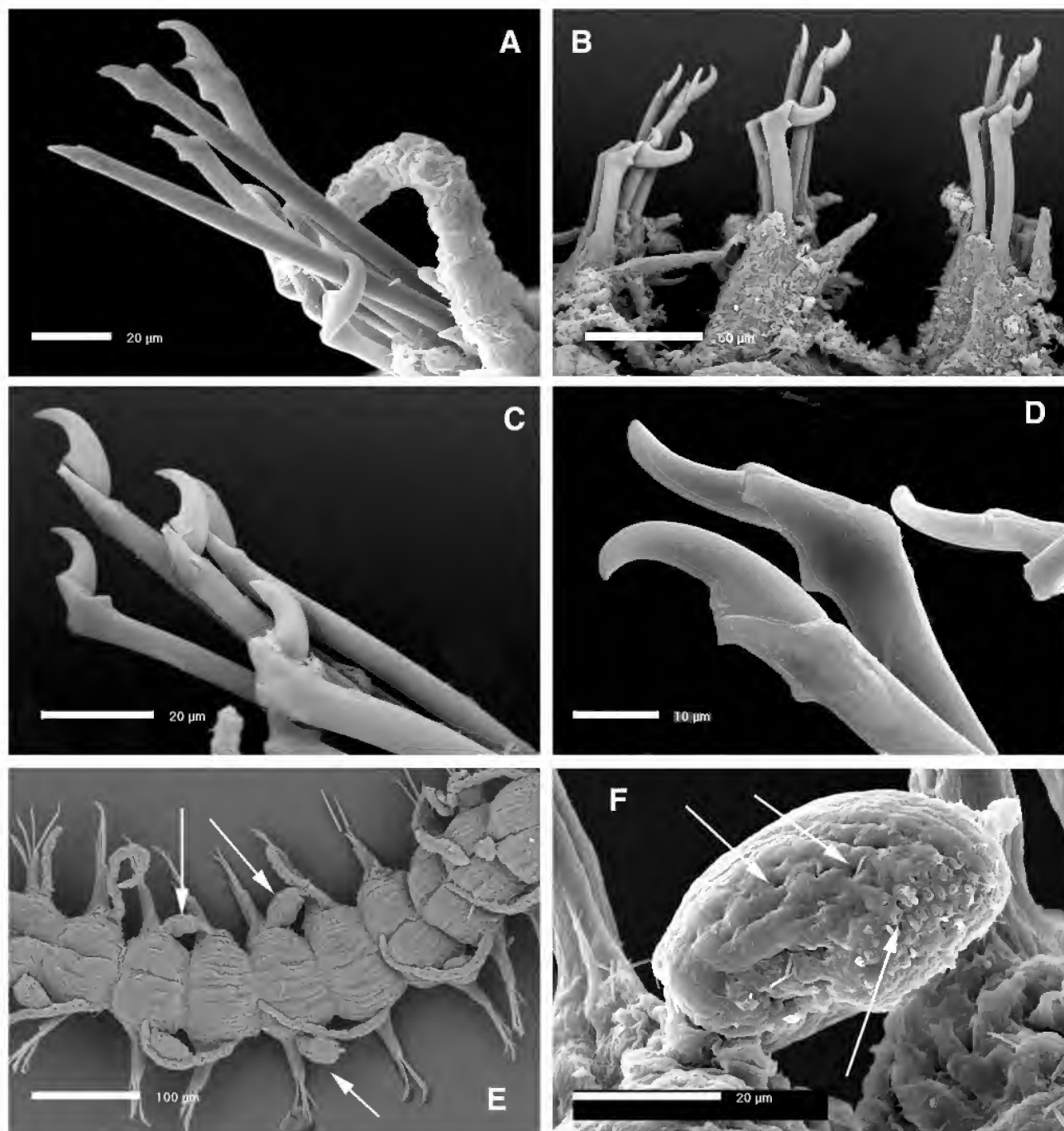


Fig. 19. SEM of *Branchiosyllis verruculosa* (Augener, 1913): (A,B), mid-posterior chaetal fascicles; (C,D), posterior chaetae. SEM of *Parasphaerosyllis indica* Monro, 1937: (E), midbody, dorsal view; (F), reduced dorsal cirrus, midbody. A–D: AM W30130; E–F: AM W30153.

W30134); SW corner of Lucas Is., 15°13'S 124°31'E, dead coral substrate with heavy silt loading, 2–30 m, coll. P.A. Hutchings, 24 July 1988, 1 (AM W30140); Lafontaine Is., 14°10'S 125°47'E, soft substrate with isolated dead coral colonies & sponges, 15 m, coll. P.A. Hutchings, 19 July 1988, 2 (AM W30141); Houtman Abrohlos, off jetty adjacent to Fisheries Hut, Beacon Is., 28°25'30"S 113°47'E, dead coral substrates, plate-like *Acropora* & *Montipora* spp., 12 m, coll. P.A. Hutchings, 23 May 1994, 2 (AM W30135); Goss Passage, Beacon Is., 28°25'30"S 113°47'E, dead plates of *Acropora* sp., covered in coralline algae & sponges, 32 m, coll. P.A. Hutchings, 19 May 1994, 1 (AM W30136); SE end of Long Is., 28°28'48"S 113°46'30"E, dead coral substrate covered in coralline algae, 8 m, coll. P.A. Hutchings, 22 May 1994, 2 (AM W30137); N end of Long Is., Goss Passage, 28°27'54"S 113°46'18"E, dead coral substrate with coralline & brown algae, 6 m, coll. C. Bryce, 22 May 1994, 1 (AM W30138); NE entrance to Goss Passage, Beacon Is., 28°27'54"S 113°46'42"E, dead branching staghorn *Acropora* sp. with coralline & brown algae, 24 m, coll. P.A. Hutchings, 25 May 1994, 1

(AM W30139); Goss Passage, Beacon Is., 28°25'30"S 113°47'E, dead plates of *Acropora* sp. covered in coralline algae, 8 m, coll. P.A. Hutchings, 22 May 1994, 1 (AM W30142); N end of Long Is., Goss Passage, 28°27'54"S 113°46'18"E, dead coral substrate covered in coralline & brown algae, 6 m, coll. C. Bryce, 22 May 1994, 1 (AM W30143); Reef W of groyne, 2 km S of Cape Peron, 32°16'S 115°41'E, orange sponge, 4.5 m, coll. R.T. Springthorpe, 26 Dec. 1983, 3 (AM W26788). **South Australia:** Billy Lights Point, Port Lincoln, 34°45'S 135°53'E, stone washings from sheltered intertidal rocks, coll. I. Loch, 15 Feb. 1985, 3 (AM W26710). **New South Wales:** 100 m NW of Julian Rocks, Byron Bay, 28°36'48"S 153°37'48"E, shell and gravel, 15 m, coll. G.D.F. Wilson, R.T. Springthorpe & L. Albertson, 3 Mar. 1992, 1 (AM W30146); 100 m NW of Julian Rocks, Byron Bay, 28°36'48"S 153°37'48"E, shell & gravel, 15 m, coll. G.D.F. Wilson, R.T. Springthorpe & L. Albertson, 3 Mar. 1992, 1 (AM W30147). **Tasman Sea:** reef flat near "Yoshin Maru Iwaki" wreck, Elizabeth Reef, 29°55'48"S 159°01'18"E, from small heads of *Acropora valida*, *Pocillopora*

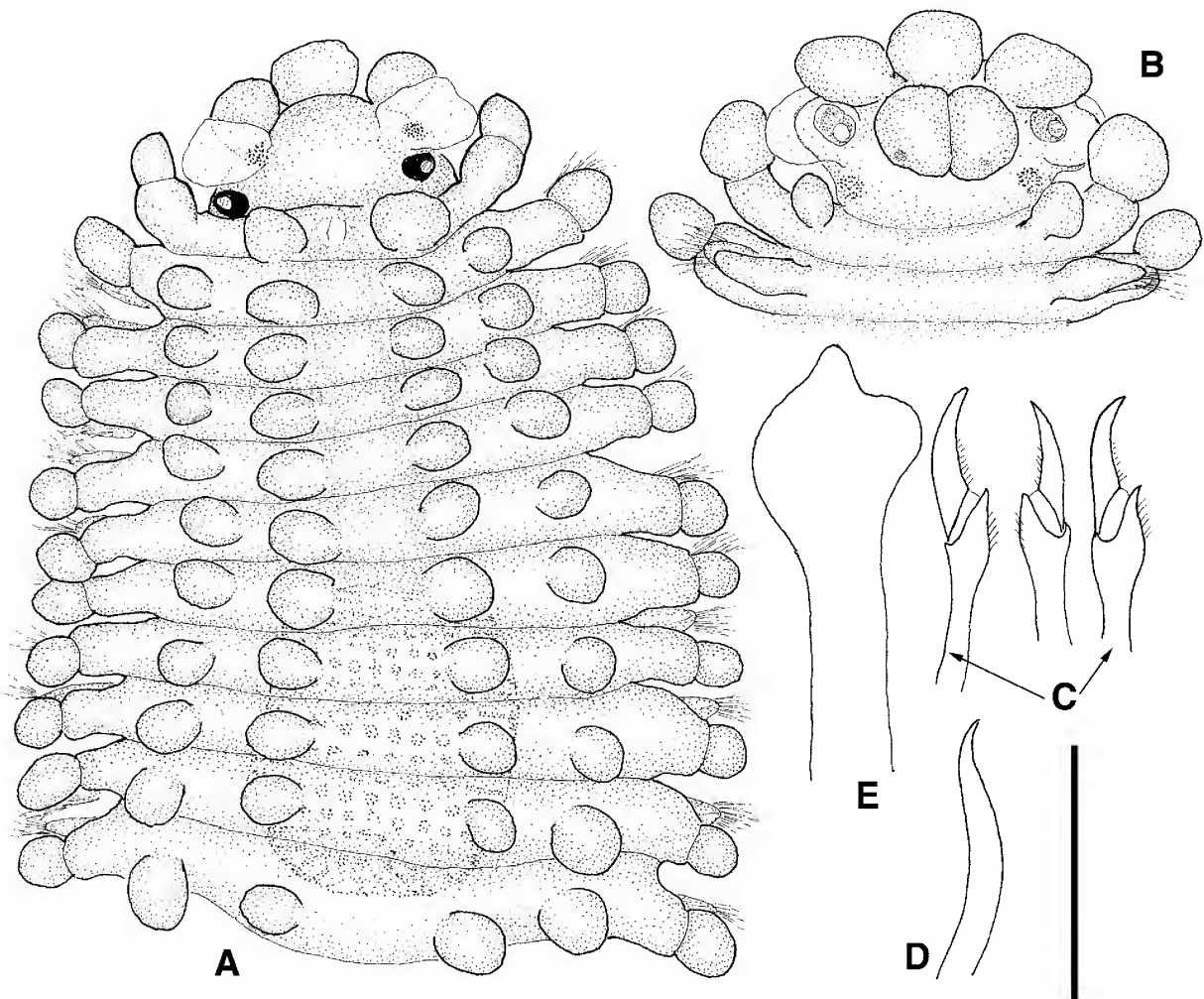


Fig. 20. *Eurysyllis tuberculata* Ehlers, 1864: (A), anterior end, dorsal view; (B), anterior end, ventral view; (C), compound chaetae; (D), ventral simple chaeta; (E), acicula. A–E: AM W30132. Scales A,B: 0.18 mm; C–E: 20  $\mu$ m.

*damicornis*, intertidal, coll. J.K. Lowry & R.T. Springthorpe, 14 Dec. 1987, 2 (AM W30144); Taupo Seamount, 33°16'51"S 156°09'09"E, 244 m, coll. J.K. Lowry on RV "Franklin", 2 May 1989, 3 (AM W30145).

**Additional material examined.** *Eurysyllis tuberculata*. SPAIN: Mediterranean: Islas Columbretes, Castellón, 39°54'02"N 00°41'15"E, 47 m, 12 July 1994, 2 (MNCN 16.01/6553); Balearic Is. Punta Jova, W Mallorca, 39°38'50"N 02°25'13"E, 10 m, 24 June 1994, 9 (MNCN 16.01/6554); Cabo Pino, Málaga, 6 (MNCN 16.01/178); Atlantic Ocean, Banco de Galicia, 42°42'37"–42°43'00"N to 11°47'87"–11°45'78"E, 769–760 m, 28 June 1991, 1 (MNCN 16.01/6552).

**Description.** Longest specimen examined, 4.5 mm long, 0.35 mm wide, with 56 chaetigers plus stolon of about 20 chaetigers. Body ovate-elongated, dorsoventrally flattened, without colour markings. Dorsum of each segment provided with 4 rounded tubercles, sometimes distally pointed, forming 4 longitudinal rows of tubercles; peristomium with only 2 dorsal tubercles (Fig. 20A). Prostomium triangular; posterior eyes located dorsally near posterior margin of prostomium; anterior eyes located ventrally near anterior margin, eyespots also located ventrally, near palps. Three spherical, short antennae on anterior margin of prostomium; 2 dorsolateral lobes, sometimes difficult to see, close to lateral antennae, similar in size and shape to antennae (Fig. 20A). Palps ventrally folded, spherical, fused all along their length, with median groove (Fig. 20B). Nuchal organs not

observed. Peristomium shorter than subsequent segments; dorsal tentacular cirri spherical, similar in size to antennae; ventral tentacular cirri smaller than dorsal ones, only visible ventrally. Segments numerous and short; cirrophores well developed; dorsal cirri with single article, spherical, small, similar in size and shape to antennae and tentacular cirri (Fig. 20A). Ventral cirri triangular. Compound chaetae heterogomph falcigers; shafts distally spinose, blades short, falcate, unidentate, with short spines on margin or almost smooth (Fig. 20C), about 10–11  $\mu$ m long; anterior parapodia with 10–12 compound falcigers, decreasing posteriorly to 4–5. Dorsal simple chaetae absent. Ventral simple chaetae sigmoid, smooth, unidentate (Fig. 20D), present on most posterior parapodia. Acicula solitary, large, distally expanded, with distal, short tip (Fig. 20E). Pharynx slender, proportionally long, through 7–9 segments. Proventricle short, ovoid, through 3–4 segments, with about 16 muscle cell rows. Stolons with eyes located ventrally.

**Remarks.** There are only three other species recognized in this genus: *E. pacificum* (Hartman, 1954) from Marshall Is., *E. spicum* Kudenov & Harris, 1995, from California, USA, and *E. japonicum* Imajima, 2003, from Japan. *Eurysyllis spicum* and *E. japonicum* differ from *Eurysyllis tuberculata* in the shape of the aciculae and in details of the compound



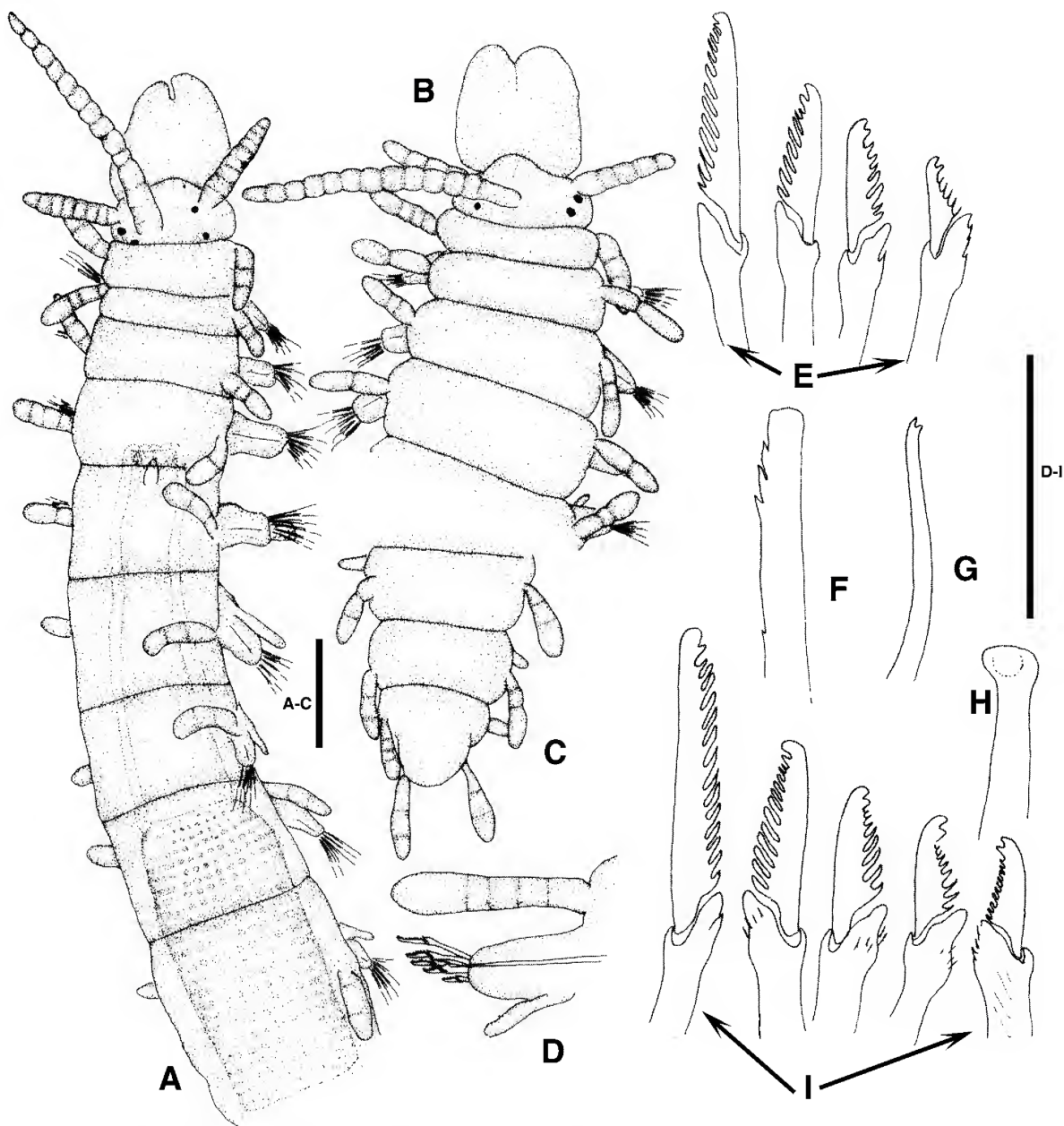


Fig. 21. *Karroonsyllis exogoneformis* San Martín & López, 2003; (A,B), anterior end, dorsal view; (C), posterior end, dorsal view; (D), midbody parapodium; (E), anterior compound chaetae; (F), dorsal simple chaeta; (G), ventral simple chaeta; (H), acicula; (I), posterior compound chaetae. All figures after San Martín & López, 2003. Scales A–C: 0.1 mm; D: 50 µm; E–I: 20 µm.

chaetae (see Hartman, 1954; Kudenov & Harris, 1995; Imajima, 2003); *E. pacificum* needs revision, as it was poorly described, and it appears to be similar to *E. tuberculata*.

**Habitat.** Occurs from intertidal to 30 m, often associated with dead coral substrate, encrusted with algae or sponges.

**Distribution.** Australia (North and Central Western Australia, South Australia, Tasman Sea, New South Wales), Mediterranean, Red Sea, Eastern Atlantic from North Sea to Canary Islands and Western Atlantic from North Carolina (USA) to Gulf of México.

**Genus *Karroonsyllis*  
San Martín & López, 2003**

*Karroonsyllis* San Martín & López, 2003: 192.

**Diagnosis.** Body small (in meiofaunal size range), slender, cylindrical, with numerous segments. Prostomium with 2 pairs of eyes and paired anterior ocular spots; 3 articulated antennae. Palps long and broad, fused along their entire length, except for terminal notch. Tentacular segment similar to following ones, with 1 pair of articulated tentacular cirri; nuchal organs as ciliated grooves in ventrolateral position. Segments without ciliary bands. Dorsal cirri on all segments, articulated, each with few articles. Parapodia each with

several compound chaetae, and simple dorsal and ventral capillary chaetae on posterior parapodia. Two anal cirri, similar to dorsal cirri. Pharynx similar in length or longer than proventricle, with single dorsal, conical tooth and crown of soft papillae.

**Type species.** *Karroosyllis exogoneformis* San Martín & López, 2003 by monotypy.

***Karroosyllis exogoneformis*  
San Martín & López, 2003**

Fig. 21A–I

*Karroosyllis exogoneformis* San Martín & López, 2003:  
192, figs 1–3.

**Material examined. Western Australia:** Houtman Abrohlos, SE end of Long Is., Goss Passage, 28°28'48"S 113°46'30"E, dead coral substrate, embedded in calcareous substrate, 30 m, coll. P.A. Hutchings, 22 May 1994, holotype (AM W26500); paratypes: 5 (AM W26501), SE end of Long Is., Goss Passage, 28°28'48"S 113°46'30"E, dead coral substrate embedded in calcareous substrate, 30 m, coll. P.A. Hutchings, 22 May 1994; 7 (AM W26502), Goss Passage, Beacon Is., 28°25'30"S 113°47'E, dead coral plates covered in coralline algae, 8 m, coll. P.A. Hutchings, 22 May 1994; 2 (AM W26503), N end of Long Is., Goss Passage, 28°28'18"S 113°46'18"E, dead coral covered with coralline algae & boring bivalves, 8 m, coll. C. Bryce, 22 May 1994; 3 (AM W26504) and 6 (AM W26505), NE entrance to Goss Passage, Beacon Is., 28°27'54"S 113°46'42"E, dead *Acropora* sp., coralline & brown algae on coral substrate, 24 m, coll. P.A. Hutchings, 25 May 1994; 1 (on SEM stub), (AM W27096), N end of Long Is., 28°27'54"S 113°46'18"E, dead coral substrate with coralline & brown algae, 5 m, coll. C. Bryce, 22 May 1994; 2 (AM W27097) and 1 (on SEM stub) (AM W27144), off S end of Long Is., Beacon Is., 28°28'48"S 113°46'18"E, dead coral substrate covered in coralline algae, 5 m, coll. P.A. Hutchings, 25 May 1994. Houtman Abrohlos; Goss Passage, Beacon Is., 28°25'30"S 113°47'E, dead plates of *Acropora* sp., covered in coralline algae, 8 m, coll. P.A. Hutchings, 22 May 1994, 1 (AM W30148); NE entrance to Goss Passage, Beacon Is., 28°27'54"S 113°46'42"E, dead branching staghorn *Acropora* sp., coralline & brown algae, 24 m, coll. P.A. Hutchings, 25 May 1994, 2 (AM W30149); Goss Passage, Beacon Is., 28°25'30"S 113°47'E, dead plates of *Acropora* sp., covered in coralline algae, 20 m, coll. P.A. Hutchings, 20 May 1994, 1 (AM W30150); NE entrance to Goss Passage, Beacon Is., 28°27'54"S 113°46'42"E, dead plate-like *Acropora* sp., covered in coralline algae, 8 m, coll. P.A. Hutchings, 25 May 1994, 1 (AM W30151); Goss Passage, Beacon Is., 28°25'30"S 113°47'E, dead plates of *Acropora* sp., covered in coralline algae, 8 m, coll. P.A. Hutchings, 19 May 1994, 4 (AM W30152). **New South Wales:** Bass Point, 34°36'S 150°54'E, coll. The Ecology Lab for RMI/Pioneer Project, 1990, 50 m, 1 (AM W23861); E of Long Reef, 33°43'37"S 151°19'27"E, sand, 30 m, coll. NSW Fisheries Research Institute, 24 July 1989, 1 (AM W24376).

**Description.** Body long and slender. Holotype complete, 6 mm long, 0.2 mm wide, with 48 chaetigers; without colour markings. Largest paratype 7 mm long, 0.23 mm wide, with 55 chaetigers, mid-body and posterior segments clearly defined by inter-segmental constrictions. Prostomium oval to sub-pentagonal, wider than long with 4 small eyes in trapezoidal arrangement and 1 pair of anterior eyespots (Fig. 21A), not always visible (Fig. 21B). Antennae longer than combined length of prostomium and palps, with 12–13 articles, 3–4 basal articles indistinct; lateral antennae originating close to anterior pair of eyes, shorter than median antenna, similar in length to palps (Fig. 21A,B), with 5–9 articles. Palps long, about 1.5–2× length of prostomium, dorsally fused except for distal tip (Fig. 21A,B). Nuchal organs ventrolaterally located, as ciliated ridges surrounded by lips (see Fig. 3B, in San Martín & López, 2003). Tentacular segment well-developed, similar in length to

following ones; 1 pair of tentacular cirri, shorter than lateral antennae, with 3–4 articles. Dorsal cirri short and articulated, longer than parapodial lobes, with 2–5 articles, distal article typically longer and wider than others (Fig. 21A–D), slightly inflated. Parapodial lobes conical, distally rounded; ventral cirri digitiform, slightly longer than parapodial lobes (Fig. 21D). Anterior parapodia each with about 6 heterogomph compound chaetae; shaft heads smooth or with few slender spines. Chaetal blades distinctly bidentate, both teeth similar in size and shape, with coarse, moderately long spines along margin (Fig. 21E,I). Blade lengths decreasing progressively from 18 µm dorsally to 7.5 µm ventrally. Middle and posterior chaetigers also with about 6 heterogomph compound chaetae, blades with coarser serrations relative to chaetae of anterior parapodia, shafts with distinct spines. Blades of most dorsal compound chaetae distinctly longer than others, about 24 µm long, with distal tooth rounded and slightly expanded. Blades of other 5 compound chaetae show similar gradation to those of anterior parapodia. Dorsalmost chaetae with blades 15 µm long, with small subdistal tooth and larger, rounded distal one, ventralmost chaetae with blades 9 µm long, with both teeth robust and similar in size; distal one slightly more acute (Fig. 21I). Solitary dorsal simple chaetae from mid-body onwards, truncate, subdistal margin with several rows of coarse spines (Fig. 21F). Single ventral simple chaetae on posterior parapodia, slender, sigmoid, bidentate and smooth (Fig. 21G). Single acicula per parapodium, distally rounded, with hollow tip (Fig. 21H). Pharynx (Fig. 21A) through from segments 3–4 to 7–8, pharyngeal tooth large, near anterior rim, surrounded by crown of soft papillae. Proventricle shorter than pharynx, extending through 2 segments, with about 24 muscle cell rows. Pygidium triangular, distally rounded, with pair of anal cirri, similar in length and shape to dorsal cirri, with 2–3 articles (Fig. 21C).

**Habitat.** Occurs from 5–30 m in amongst dead coral rubble covered with coralline algae.

**Distribution.** Australia (Central Western Australia, New South Wales).

**Genus *Parasphaerosyllis* Monroe, 1937**

*Parasphaerosyllis* Monroe, 1937: 273.

**Diagnosis.** Body of medium to large size, with numerous segments. Prostomium with 3 antennae, 2 pairs of eyes, sometimes 1 pair of anterior eyespots, and 2 palps. Palps fused basally. Two pairs of tentacular cirri. Antennae, tentacular, anal, and anterior dorsal cirri distinctly articulate, from mid-body alternating long strongly articulated dorsal cirri with short, unarticulated, lemon-like shaped cirri. Pharynx similar in length or longer than proventricle, with tooth, located on anterior rim, surrounded by crown of soft papillae. Compound chaetae with falcigerous blades; dorsal and ventral simple capillary chaetae present. Ventral cirri ovate. Schizogamic reproduction by means of stolons.

**Type species:** *Parasphaerosyllis indica* Monroe, 1937, by monotypy.

**Remarks.** *Parasphaerosyllis* is similar to *Syllis*, differing only in having some dorsal cirri with a single, expanded,



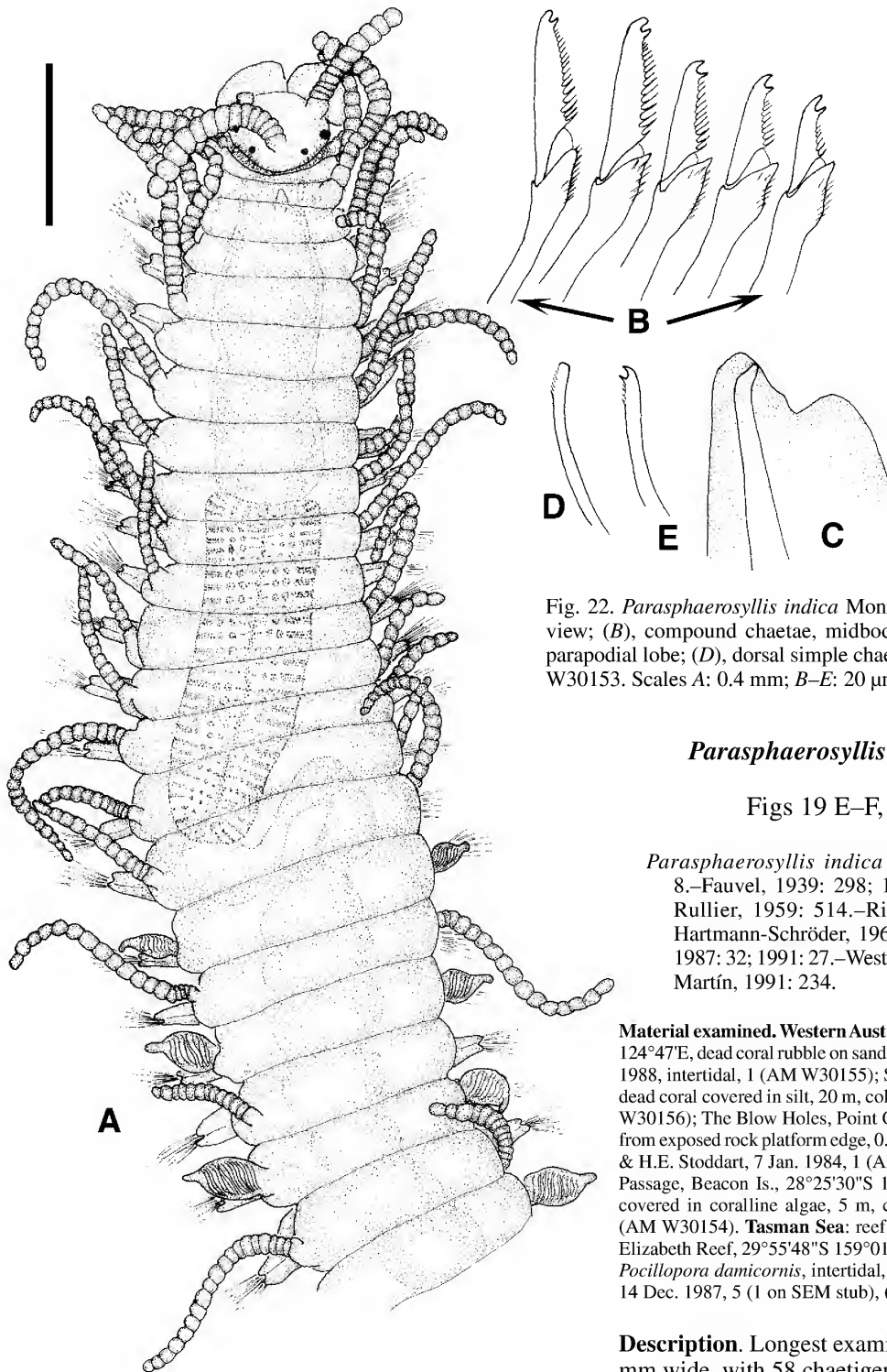


Fig. 22. *Parasphaerosyllis indica* Monro, 1937: (A), anterior end, dorsal view; (B), compound chaetae, midbody; (C), acicula and distal end of parapodial lobe; (D), dorsal simple chaeta; (E), ventral simple chaeta. AM W30153. Scales A: 0.4 mm; B–E: 20  $\mu$ m.

### *Parasphaerosyllis indica* Monro, 1937

Figs 19 E–F, 22A–E, 24A–B

*Parasphaerosyllis indica* Monro, 1937: 273, text-fig. 8.–Fauvel, 1939: 298; 1950: 351; 1953: 9.–Fauvel & Rullier, 1959: 514.–Rioja, 1958: 246, figs 21–27.–Hartmann-Schröder, 1960: 84, pl. 6, fig. 50; 1980: 49; 1987: 32; 1991: 27.–Westheide, 1974: 64, figs 27–29.–San Martín, 1991: 234.

**Material examined.** **Western Australia:** Kimberley region: Bernouli, 15°S 124°47'E, dead coral rubble on sandy substrate, coll. P.A. Hutchings, 12 July 1988, intertidal, 1 (AM W30155); S side of Long Reef, 14°01'S 125°44'E, dead coral covered in silt, 20 m, coll. P.A. Hutchings, 18 July 1988, 3 (AM W30156); The Blow Holes, Point Quobba, 24°39'S 113°25'E, green algae from exposed rock platform edge, 0.5 m, coll. J.K. Lowry, R.T. Springthorpe & H.E. Stoddart, 7 Jan. 1984, 1 (AM W26789); Houtman Abrohlos, Goss Passage, Beacon Is., 28°25'30"S 113°47'E, dead plates of *Acropora* sp., covered in coralline algae, 5 m, coll. P.A. Hutchings, 22 May 1994, 2 (AM W30154). **Tasman Sea:** reef flat near "Yoshin Maru Iwaki" wreck, Elizabeth Reef, 29°55'48"S 159°01'18"E, small heads of *Acropora valida*, *Pocillopora damicornis*, intertidal, coll. J.K. Lowry & R.T. Springthorpe, 14 Dec. 1987, 5 (1 on SEM stub), (AM W30153).

**Description.** Longest examined specimen 4 mm long, 0.21 mm wide, with 58 chaetigers; largest known specimens up to 17 mm long, 0.27 mm wide, with 86 chaetigers. Body long and slender, colourless. Prostomium circular to ovate; 4 small eyes in open trapezoidal arrangement; median antenna inserted between posterior eyes, with up to 54 articles; lateral antennae inserted close to anterior margin of prostomium, in front of anterior eyes, with up to 24 articles. Palps fused at base, shorter than prostomium, sometimes ventrally folded. Nuchal organs not observed. Peristomium shorter than subsequent segments (Fig. 22A); dorsal tentacular cirri long, with up to 43 articles; ventral tentacular cirri shorter, with up to 22 articles. Dorsal cirri of anterior segments all

lemon-like shaped article. Five species are known: *P. indica*, the type species of the genus, has been reported widely from tropical waters; *P. uschakovi* (Chlebovitsch, 1959), from Kurile Islands, Russia; *P. ezoensis* Imajima & Hartman, 1964 and *P. setoensis* Imajima, 1966, both from Japan; and finally *P. malimalii* Capa *et al.*, 2001, from the Pacific coast of Panamá (see Capa *et al.*, 2001b, for a general discussion of the species of the genus).

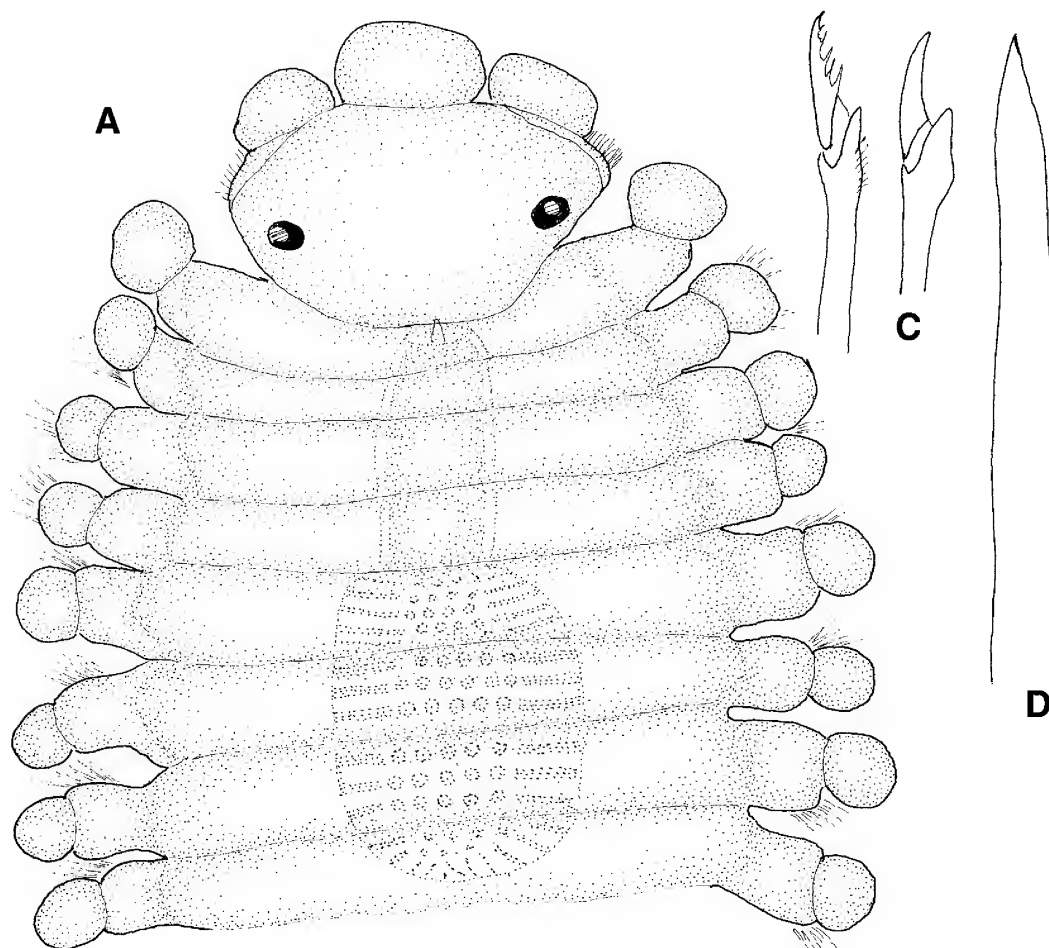


Fig. 23. *Plakosyllis brevipes* Hartmann-Schröder, 1956: (A), anterior end, dorsal view; (B), anterior end, ventral view; (C), midbody compound chaetae; (D), midbody acicula. AM W26786. Scales A,B: 92  $\mu$ m; C,D: 20  $\mu$ m.

articulated, long, alternating irregularly in length; from level of proventricle to posterior part of body, dorsal cirri alternating long and articulated, with 25–40 articles, and short cirri, lemon-like shaped, unarticulated cirri, provided with distinct cirrophore, and dark, fibrillar inclusions (Fig. 22A). Lemon-like shaped cirri with some dorsal pores (Fig. 19E,F, arrows). Parapodia dorsally slightly bilobed (Fig. 22A,C). Ventral cirri digitiform, shorter than parapodial lobes. Compound chaetae, heterogomph falcigers; shafts distally with thin spines; blades bidentate, both teeth similar, with spines on margin (Figs 22B, 24A,B); anterior parapodia with 7 compound chaetae, number decreasing posteriorly, 5 from midbody onwards; dorsoventral gradation in length of blades, 20  $\mu$ m long above, about 16  $\mu$ m long below; blades

of anterior chaetae longer. Capillary simple chaeta on posterior parapodia, distally curved, blunt, unidentate, with few small subdistal spines (Fig. 22D). Single ventral simple capillary chaeta present on posteriormost parapodia, bidentate, both teeth similar, with few subdistal, thin spines (Fig. 22E). Acicula solitary, slender, with oblique tip (Fig. 22C). Pharynx through about 8 segments; pharyngeal tooth located anteriorly. Proventricle rectangular, through 7–8 segments, with 26–30 muscle cell rows.

**Remarks.** The senior author has examined material from the Canary Islands, Cape Verde Islands, Cuba, Panamá (Pacific), México (Pacific), and all are similar, however with such a wide distribution, molecular studies would be useful to confirm the identity of each of these disjunct populations.

**Habitat.** Occurs from intertidal to shallow depths on algae, dead coral substrate and coralline algae.

**Distribution.** Circumtropical to temperate waters, Australia (North and Central Western Australia, Victoria, New South Wales, Queensland).



**Genus *Plakosyllis* Hartmann-Schröder, 1956***Plakosyllis* Hartmann-Schröder, 1956: 87.

**Diagnosis.** Body small, oval, elongated, dorsoventrally flattened. Prostomium with 2 pairs of eyes, 3 antennae and 2 spherical palps. Antennae inserted on anterior margin of prostomium; palps inserted ventrally, not fused. Dorsum without tubercles. Two pairs of tentacular cirri. Antennae, tentacular and dorsal cirri not articulated, spherical. Ventral cirri triangular, with numerous minute pores. Two anal cirri similar to dorsal cirri. Compound chaetae are short falcigers. Pharynx similar in length or longer than proventricle, with anterior dorsal tooth, surrounded by crown of about 10 soft papillae. Proventricle short. Schizogamic reproduction by means of *Tetraglene* stolons provided with 2 pairs of eyes inserted ventrolaterally. (For illustration of *Tetraglene* stolons of *Plakosyllis brevipes* which lack antennae, see San Martín [2003, fig. 4D]).

**Type species:** *Plakosyllis brevipes* Hartmann-Schröder, 1956, by monotypy.

**Remarks.** This genus is closely related to *Eurysyllis*, differing in the absence of dorsal tubercles and fused palps. Two species of this genus are known, *P. brevipes* and *P. quadrioculata* Perkins, 1981; the former has been reported as being circumtropical as well as occurring in subtropical waters of south Western Australia (Hartmann-Schröder, 1982) and this study expands its known distribution within Australia. The other species has been reported only from the Gulf of México and the Caribbean.

***Plakosyllis brevipes* Hartmann-Schröder, 1956**

Figs 23A–D, 24C,D

*Plakosyllis brevipes* Hartmann-Schröder, 1956: 87, figs 1–8; 1982: 67, figs 48–50; 1982: 21.–Laubier, 1967: 98.–Campoy, 1982: 302.–San Martín, 2003: 300, figs 165, 166.

*Eurysyllis brevipes* Gidholm, 1962: 250, fig. 1.

**Material examined. Western Australia:** inshore limestone reef, Neds Camp, Cape Range National Park, 21°59'S 113°55'E, small purple sponge with *Caulerpa* sp. & sticky sediment, 1.5 m, coll. R.T. Springthorpe, 2 Jan. 1984, 1 (on SEM stub) (AM W26786); Houtman Abrohos: Goss Passage, Beacon Is., 28°25'30"S 113°47'E, dead plates of *Acropora* sp., covered in coralline algae & sponges, 23 m, coll. P.A. Hutchings, 19 May 1994, 1 (AM W30157). **New South Wales:** 100 m NW of Julian Rocks, Byron Bay, 28°36'48"S 153°37'48"E, shell & gravel, 15 m, coll. G.D.F. Wilson, R.T. Springthorpe & L. Albertson, 3 Mar. 1992, 2 (on SEM stub), (AM W26329); 100 m NW of Julian Rocks, Byron Bay, 28°36'48"S 153°37'48"E, sponge surface, 15 m, coll. S.J. Keable & R.T. Springthorpe, 4 Mar. 1992, 1 (AM W26330); Ledge on N side, Cook Is., 28°11'26"S 153°34'40"E, shell grit, 14 m, coll. K. Attwood, 8 June 1993, 1 (AM W26331).

**Additional material.** *Plakosyllis brevipes*. SPAIN: Balearic Is; Cabo Nati, NW of Menorca, 40°43'10" N, 03°49'28"E, 31 m, 4 (MNCN 16.01/6605).

**Description.** Body strongly flattened, oval-elongated (Fig. 24C), without colour markings, small, up to 4 mm long, 0.21 mm wide, with 40 chaetigers. Prostomium proportionally large, wide, pentagonal to trapezoidal (Figs 23A, 24C,D),

laterally ciliated; with 1 pair of dorsal and 1 pair of ventral eyes. Antennae spherical, inserted on anterior margin of prostomium. Palps ventrally located, not visible dorsally, spherical, separated from each other (Fig. 23B). Nuchal organs not observed. Peristomium shorter than following segments, anterior margin ciliated; dorsal tentacular cirri similar in size to dorsal cirri, ventral tentacular cirri smaller than dorsal ones, only visible ventrally. Dorsal cirri with distinct cirrophore and spherical, unarticulated cirrostyle (Figs 23A,B, 24C,D); ventral cirri conical, longer than parapodial lobes. Parapodial lobes acute. About 10–12 compound chaetae on midbody parapodia, with short shafts, some distally with short spines, and short, unidentate blades; most blades smooth, but 1–3 dorsal ones with long spines (Fig. 23C). Acicula solitary, stout, almost straight (Fig. 23D), protruding from parapodial lobes. Dorsal and ventral simple chaetae not seen. Pharynx short, slender, through 4–5 segments; pharyngeal tooth located on anterior margin (Fig. 23A). Trepan not seen on examined specimens, but described by Perkins (1981) as having 10 small teeth surrounding anterior border of pharynx. Proventricle short, barrel-shaped, with 11–14 muscle cell rows. Pygidium incised, with 2 anal cirri similar to dorsal cirri but smaller and oval. Some specimens with attached developing stolons (Fig. 24C).

**Habitat.** Occurs intertidally to 60 m depth, interstitially in coarse sand, on algae, sponges, and rhizomes of seagrasses.

**Distribution.** Mediterranean Sea, NE and NW Atlantic Ocean, Red Sea, Indian Ocean, New Caledonia, Australia (Western Australia, New South Wales).

**Genus *Rhopalosyllis* Augener, 1913***Rhopalosyllis* Augener, 1913: 245.

**Diagnosis.** Body long, robust, cylindrical, with numerous segments; most posterior segments achaetous. Body covered with numerous, small papillae, present on prostomium, parapodia and anal cirri, both dorsally and ventrally. Prostomium with 4 eyes and 3 antennae. Palps fused at bases, rounded, sometimes ventrally folded. Peristomium dorsally reduced, with 2 pairs of tentacular cirri. Nuchal organs as paired ciliated grooves between prostomium and peristomium. Dorsal and ventral cirri present on all parapodia. Antennae, tentacular and dorsal cirri obscurely articulated, short, oval to spindle-shaped, rough, covered by papillae. Ventral cirri conical. Compound chaetae heterogomph; on posterior segments some chaetae with fused shafts and blades, forming thick, bidentate hooks; dorsal and ventral simple chaetae present on most posterior parapodia. Pharynx and proventricle short; pharyngeal tooth long and slender. Reproduction by stolons.

**Remarks.** The genus consists of a single species, known only from Western Australia.

**Type species:** *Rhopalosyllis hamulifera* Augener, 1913, by monotypy.

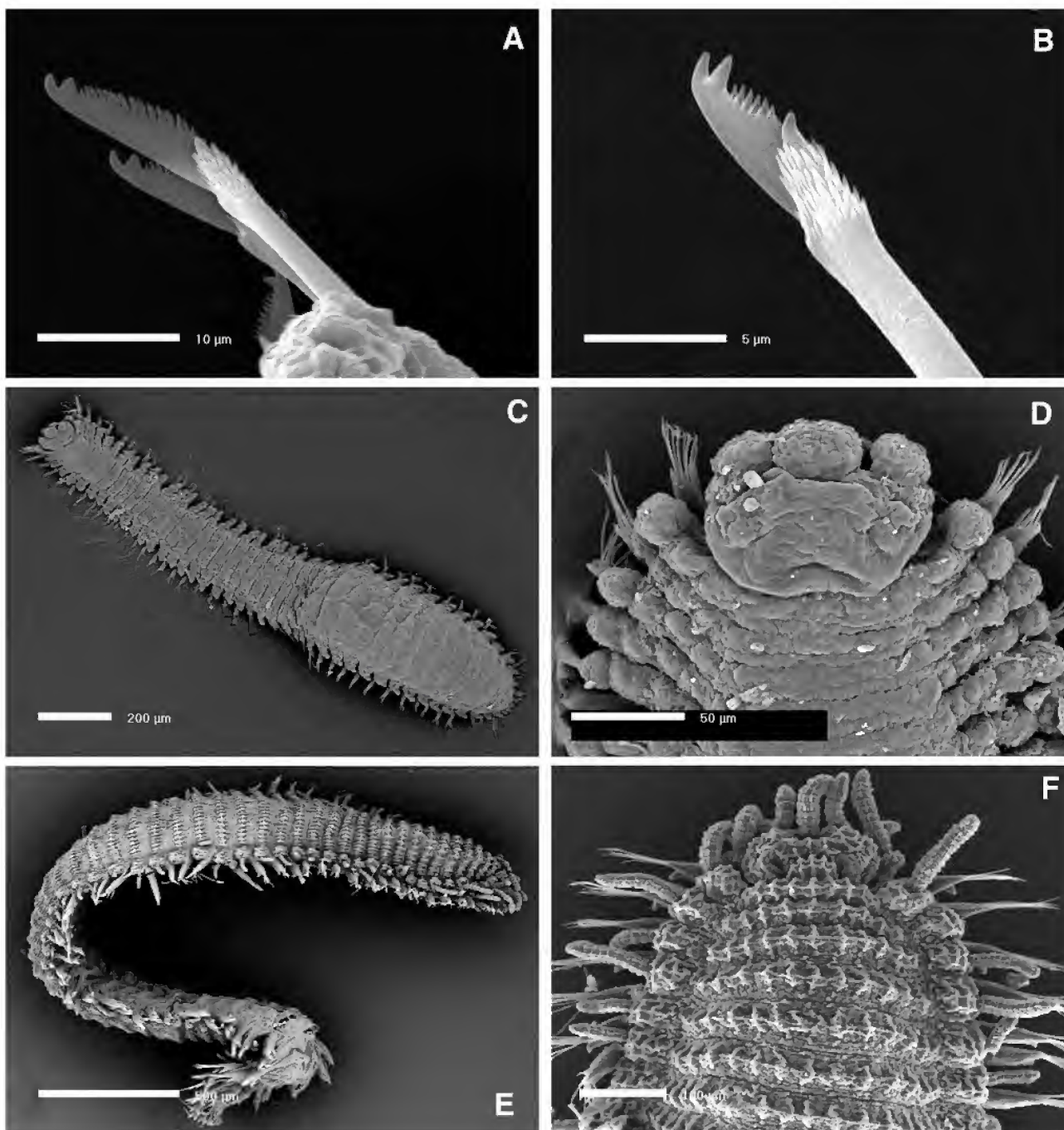


Fig. 24. SEM of *Parasphaerosyllis indica* Monro, 1937: (A), superior compound chaetae; (B), inferior compound chaeta. SEM of *Plakosyllis brevipes* Hartmann-Schröder, 1956: (C), complete specimen with stolon, dorsal view; (D), anterior end, dorsal view. SEM of *Xenosyllis moloch* n.sp.: (E), complete specimen, dorsolateral view; (F), anterior end, dorsal view. A,B: AM W30153; C,D: AM W26786; E,F: AM W30160.

### *Rhopalosyllis hamulifera* Augener, 1913

Figs 25A–F, 26A–M

*Rhopalosyllis hamulifera* Augener, 1913: 245–247, Pl. III,  
Figs 24, 25, Text-Fig. 36 a–c.

**Material examined.** Western Australia. Sharks Bay, syntypes 1 (fragment) (HZM V-10076) 11–16 m, 1 (HZM V-7963). Kimberley region, reef south of Lucas Is., Brunswick Bay, 15°16'S 124°29'E, dead coral & *Sargassum* with heavy silt load, intertidal, 2 m, coll. P.A. Hutchings, 24 July 1988, 1 (juvenile) (AM W30158); Inshore limestone reef, Neds Camp, Cape Range National Park, 21°59'S 113°55'E, *Caulerpa* sp., 1 m, coll. J.K. Lowry, 2 Jan. 1984, 1 (AM W26740).

**Description.** Body long, cylindrical, broad anteriorly, tapered posteriorly (Fig. 25B), 8.2 mm long, 0.36 mm wide, 0.40 mm maximum width at mid-body, with 82 chaetigers, plus 6–7 achaetous segments. Numerous small papillae covering dorsal and ventral surfaces, antennae, tentacular, dorsal, ventral, and anal cirri, as well as parapodial lobes (Fig. 25A–F). Prostomium oval, with 4 small eyes in open trapezoidal arrangement. Antennae thick, rough, short, shorter than combined length of prostomium and palps, oval; lateral antennae inserted on anterior margin, median antenna inserted just behind anterior margin of prostomium (Fig. 25A). Palps large, broad, ventrally folded (Fig. 25A,C,E).



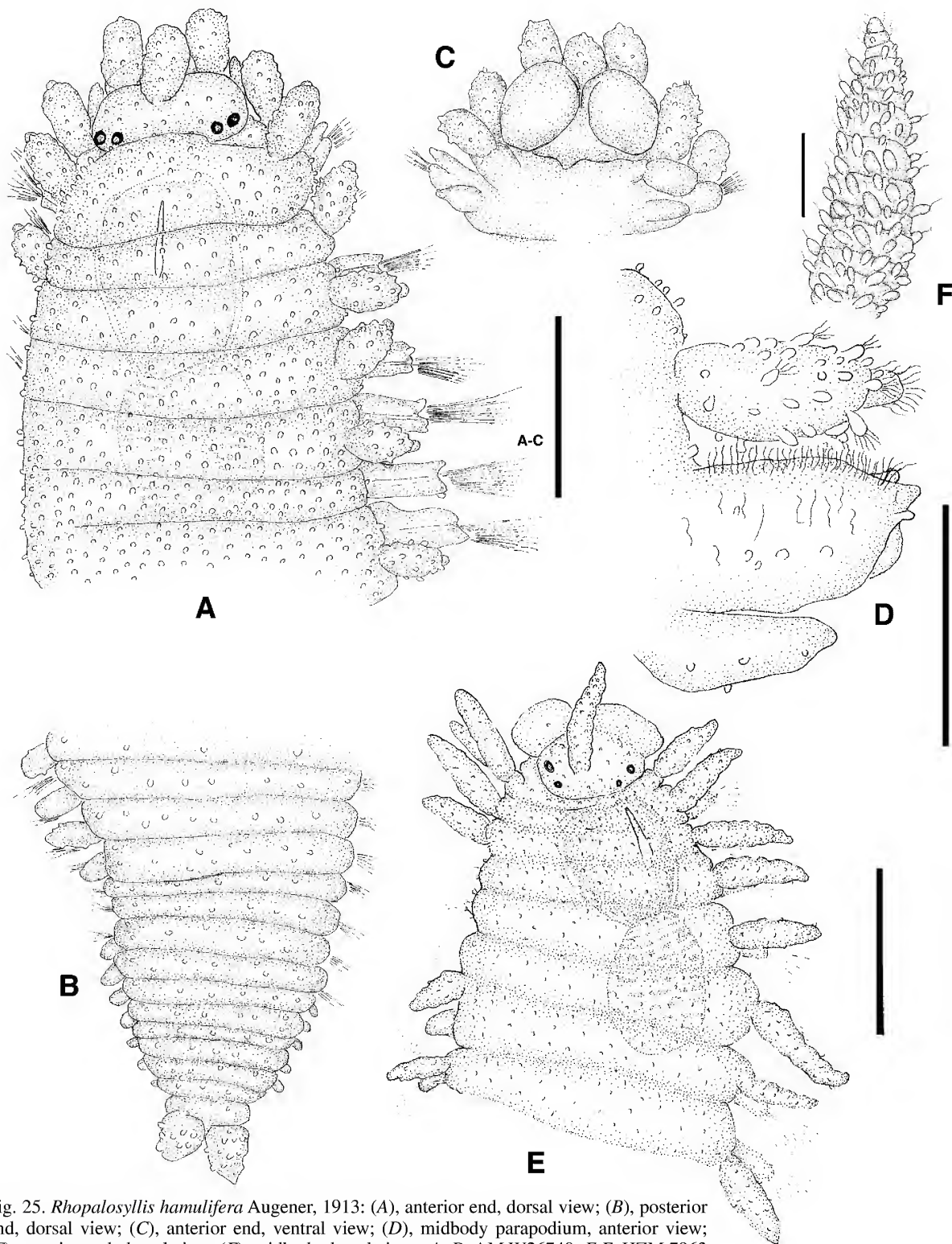


Fig. 25. *Rhopalosyllis hamulifera* Augener, 1913: (A), anterior end, dorsal view; (B), posterior end, dorsal view; (C), anterior end, ventral view; (D), midbody parapodium, anterior view; (E), anterior end, dorsal view; (F), midbody dorsal cirrus. A–D: AM W26740; E, F: HZM 7963 (syntype). Scales A–C: 0.18 mm; D, F: 92  $\mu$ m; D: 0.20 mm.

Nuchal organs not observed. Peristomium dorsally reduced, covered by fold of chaetiger 1; tentacular cirri similar to antennae, ventral ones smaller than dorsal tentacular cirri. Dorsal cirri similar in shape to antennae and tentacular cirri, each with terminal button, covered with tufts of long cilia (Fig. 25D); some papillae of dorsal cirri also provided with

tufts of cilia. Parapodia with 1 pre-chaetal and 2 post-chaetal terminal papillae; ventral cirri conical, shorter than parapodial lobes (Fig. 25D). Parapodia of first 3 chaetigers with about 10 compound, heterogomph chaetae, with short shafts and small, bidentate, short blades (Fig. 26A), both teeth similar in size, 6–7  $\mu$ m long. Subsequent anterior parapodia with

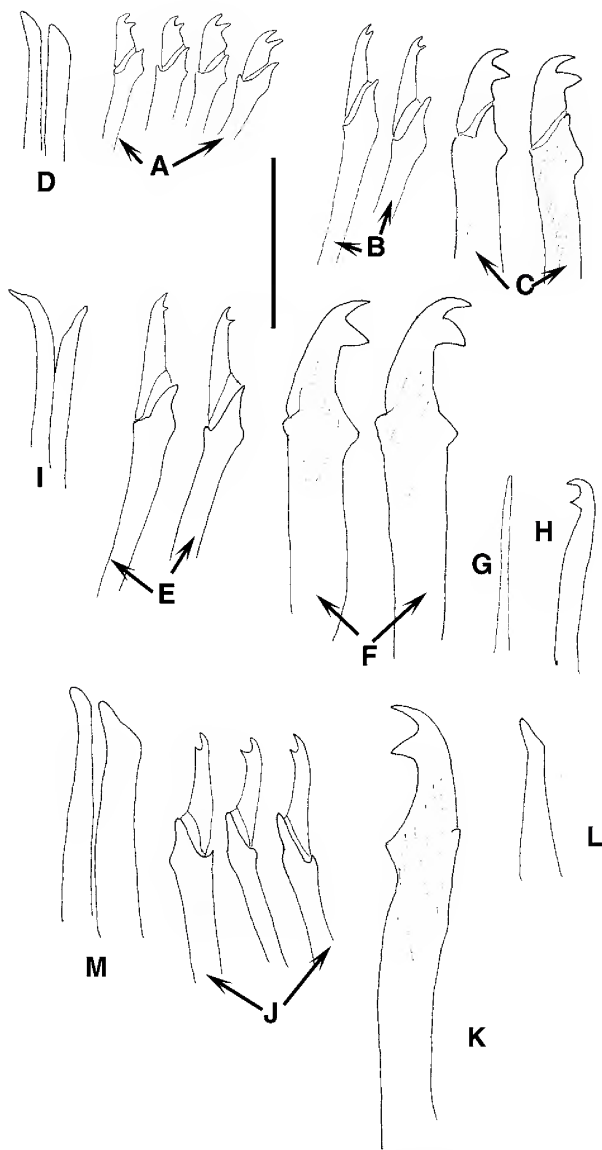


Fig. 26. *Rhopalosyllis hamulifera* Augener, 1913: (A), most anterior compound chaetae; (B), superior chaetae, anterior parapodium; (C), inferior compound chaetae, anterior parapodium; (D), anterior aciculae; (E), midbody superior compound chaetae; (F), midbody inferior chaetae; (G), dorsal simple chaeta; (H), ventral simple chaeta; (I), midbody aciculae; (J), posterior superior compound chaetae; (K), inferior posterior chaeta; (L), posterior acicula. A–L: AM W26740. Scale: 20  $\mu$ m.

about 5 compound, heterogomph chaetae with long, slender shafts, and thin, bidentate, smooth blades (Fig. 26B), about 12  $\mu$ m long, plus 2 compound chaetae with enlarged shafts, bidentate blades, about 12  $\mu$ m long, partially fused to shafts, most ventrally located (Fig. 26C); ventral chaetae becoming totally fused on posterior parapodia, forming large bidentate hooks (Fig. 26F), and remaining chaetae similar to those present on anterior chaetigers (Fig. 26E). About 5 compound chaetae on posterior parapodia, similar to those present on anterior and mid-body parapodia (Fig. 26J), and single, thick hook (Fig. 26K). Dorsal and ventral simple chaetae present on most posterior parapodia. Dorsal simple chaetae slender, needle-shaped (Fig. 26G); ventral simple chaetae thick, strongly bidentate, thinner than compound chaetae

(Fig. 26H). Anterior and midbody parapodia with 2 slender aciculae, 1 straight, other slightly bent (Fig. 26D,I,M); single acicula in posterior parapodia. Pharynx wide, extending through 3 segments; pharyngeal tooth long and slender,  $\frac{1}{2}$  length of pharynx (Fig. 25A,E), may be difficult to see. Proventricle short, small, through 3 segments, with about 15 muscle cell rows. Pygidium rectangular, with 2 oval to conical anal cirri (Fig. 25B). One specimen examined is a female with oocytes in posterior segments.

**Remarks.** The examined specimens agree well with the original description but the antennae and dorsal cirri are proportionally shorter and wider. The type material has apparently smooth antennae and dorsal cirri, but under higher magnification they can be seen to be articulated with 12–14 articles, densely covered by papillae, some of them with one distal cilium. One syntype (HZM V-7963) is developing a sexual stolon.

**Habitat.** Occurs intertidally and in shallow depths, in amongst dead coral rubble and algae.

**Distribution.** Australia (North Western Australia).

### Genus *Tetrapalpia* n.gen.

*Opisthosyllis dorsoaciculata* Hartmann-Schröder, 1991: 26, figs 20–25.

**Diagnosis.** Body of medium size, dorsally cylindrical, with numerous segments. Prostomium with 4 eyes and, sometimes, a pair of eyespots, 3 antennae and 2 palps. Palps free, with distinct gap between them; each palp bilobed with lobes fused for most of their length. Two pairs of tentacular cirri. Antennae, tentacular, anal, and dorsal cirri distinctly articulated. Parapodia bi-lobed. Ventral cirri triangular. Compound chaetae with short falcigerous blades; capillary chaetae present. Pharynx shorter than proventricle; tooth inserted just behind from anterior margin of pharynx. Reproduction by means of stolons.

**Type species.** *Opisthosyllis dorsoaciculata* Hartmann-Schröder, 1991 by subsequent designation.

**Remarks.** The single known species of the genus, only known from the type-locality in Queensland, was originally described as belonging to the genus *Opisthosyllis* Langerhans, 1879; however, this species differs in several characters from other species in this genus. The pharyngeal tooth is located just behind the opening of the pharynx, which is shorter than the proventricle; in *Opisthosyllis* the pharynx is longer than the proventricle and the tooth is located posteriorly. *Tetrapalpia* is unusual in having palps free to their bases; each palp is bilobed, with the lobes fused for most of their length; so that it appears as if four palps are present. This palpal configuration is unique within the family Syllidae.

**Etymology.** The generic name derives from the Latin *Tetra*, meaning four, in reference to the appearance of having four palps present rather than the two typical for the family.



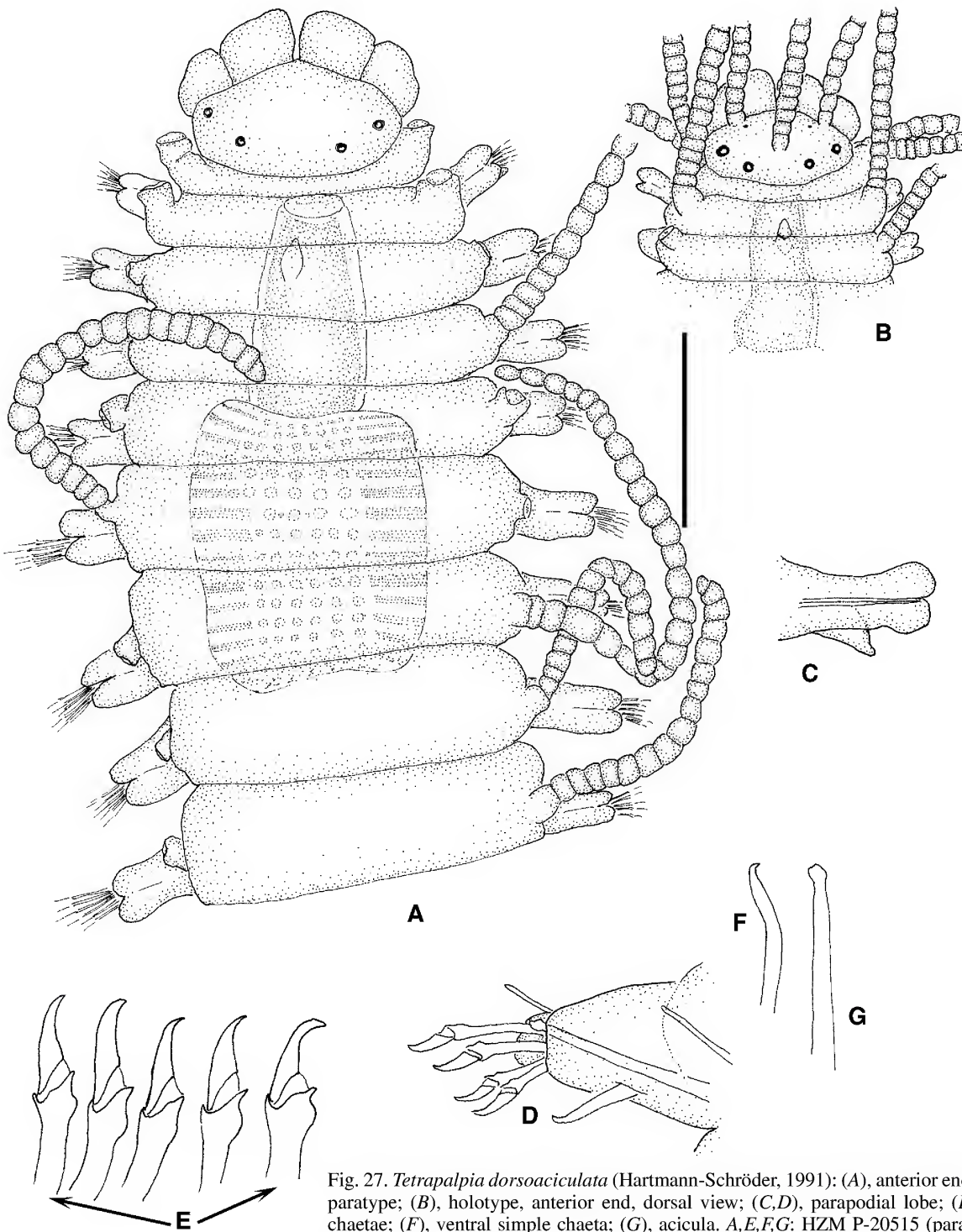


Fig. 27. *Tetrapalpia dorsoaciculata* (Hartmann-Schröder, 1991): (A), anterior end, dorsal view, paratype; (B), holotype, anterior end, dorsal view; (C,D), parapodial lobe; (E), compound chaetae; (F), ventral simple chaeta; (G), acicula. A,E,F,G: HZM P-20515 (paratype). B,C,D: after Hartmann-Schröder, 1991, holotype. Scales A: 0.14 mm; E–G: 20  $\mu$ m.

***Tetrapalpia dorsoaciculata*  
(Hartmann-Schröder, 1991) n.comb.**

Fig. 27A–G

*Opisthosyllis dorsoaciculata* Hartmann-Schröder, 1991: 26, figs 20–25.

**Material examined.** Queensland. Heron Is., North Reef, 23°27'S 151°55'E, coral sand from tidal pool among corals, intertidal, coll. G. Hartmann-Schröder, 6 Feb. 1976, HOLOTYPE, (ZMH P-20514), PARATYPES, 3 (HZM P-20515), 1 (AM W20389) 2 (HZM P-20532).

**Description.** Based on Hartmann-Schröder (1991), and our own re examination of the types. Body of medium size, long and slender, holotype 5.6 mm long (*vide* Hartmann-Schröder, 1991), 0.3 mm wide, with 62 chaetigers, with developing sexual stolon of 10 chaetigers, dorsally cylindrical. Prostomium oval to pentagonal, wider than long, with 4 eyes and, sometimes pair of eyespots. Median antenna inserted on middle of prostomium (Fig. 27B), with 25 articles; lateral antennae with 13 articles. Palps free from each other, with longitudinal groove, appearing bilobed (Fig. 27A). Nuchal organs not observed. Two pairs of tentacular

cirri; dorsal tentacular cirri with 33 articles, ventral ones with 12. Antennae, tentacular, anal, and dorsal cirri articulated, fragile, slender (Fig. 27A). Parapodia bi-lobed (Fig. 27C,D). Ventral cirri triangular (Fig. 27C). Compound chaetae with short falcigerous, unidentate blades (Fig. 27E,D); anterior parapodia with 10 chaetae, decreasing to 8 on midbody and 4–6 on posterior parapodia; dorsal capillary chaetae on posterior parapodia, slender, unidentate (Fig. 27D); ventral simple chaetae sigmoid, unidentate, smooth (Fig. 27D,F), present on posterior parapodia. Aciculae solitary, slender, distally knobbed (Fig. 27G). Pharynx shorter than proventricle, though 3–4 segments (Fig. 27A,B); tooth located just behind anterior opening of pharynx. Proventricle through 3 segments, with 17–19 muscle cell rows.

**Remarks.** This species and this new genus is characterized by each palp being incompletely divided by a furrow or groove. This character is only visible when antennae are detached as on the some of the paratypes and were overlooked in the original description which explains why they were placed in the wrong genus originally.

**Habitat.** Occurs in shallow water, interstitially in coralline sand.

**Distribution.** Australia (Heron Island, Queensland).

### Genus *Xenosyllis* Marion & Bobretzky, 1875

*Xenosyllis* Marion & Bobretzky, 1875: 26.

**Diagnosis.** Body of medium size, elongated, dorsoventrally flattened, convex dorsally, with numerous, short segments. Prostomium with 4 eyes, 3 antennae and 2 palps. Palps free from each other, ventrally located. Prostomium and lateral margins of each segment with papillae; dorsally provided with longitudinal striations. Tentacular segment reduced, dorsally with distinct medial, marginally papillated lobe. Antennae, tentacular, anal, and dorsal cirri short, articulated, covered by papillae. Pharynx long, unarmed. Proventricle short. Compound chaetae with falcigerous blades; capillary simple chaetae also present. Two anal cirri.

**Type species:** *Syllis scabra* Ehlers, 1864 by monotypy.

**Remarks.** Prior to this study the genus was known only from the type species from the Mediterranean Sea and North Atlantic. Two new species have been found, *Xenosyllis moloch* and *Xenosyllis scabroides*. The genus has not previously been recorded from Australia.

### *Xenosyllis moloch* n.sp.

Figs 24E,F, 28A–D, 29A–F, 30A–D

**Type material.** HOLOTYPE, (AM W30159), **Tasman Sea:** Taupo Seamount, 33°16'51"S 156°09'09"E, 244 m, coll. J.K. Lowry on RV "Franklin", 2 May 1989, PARATYPES 15 (4 on SEM stub), (AM W30160).

**Additional material examined.** *Xenosyllis scabra*. SPAIN: Mediterranean Sea. S La Horadada, Islas Columbretes, Castellón, 39°52'38"–39°52'36"N 00°40'07"–00°40'28"E, 24 m, 1 (MNCN 16.01/6616).

**Description.** Longest examined specimen 5 mm long, 0.6 mm wide, with 64 chaetigers. Body markedly flattened, ribbon-like, somewhat convex dorsally with numerous short segments (Figs 24E, 28A), anteriorly blunt, posteriorly tapered (Fig. 24E). Prostomium, cirrophores and cirri covered with numerous papillae (Figs 24E–F, 28A, 29A–E); dorsum with numerous papillae and crests arranged longitudinally, each crest terminating in an anteriorly directed spine (Figs 24F, 28A, 29A,C); each with 1–2, or 3, distal pores (Fig. 29D,E, arrows), only visible under SEM. Degree of papillation and ornamentation of dorsum, variable between individuals. Prostomium bilobed, provided with numerous papillae (Figs 24F, 29A); 4 large subdermal eyes (Fig. 28A). Antennae originating on anterior margin, lateral ones more ventrally located; median antenna with about 8 articles; lateral antennae with 4–6 articles. Palps not visible dorsally (Figs 24F, 28A, 29A), ventrally inserted, totally separated from each other (Figs 28B, 29B). Nuchal organs not observed. Peristomium dorsally visible only as semicircular flap with highly sculptured surface, covering posterior part of prostomium (Figs 28A, 29A,C); tentacular cirri longer than antennae; dorsal tentacular cirri with about 12 articles; ventral tentacular cirri inserted latero-ventrally, with about 9 articles. Dorsal cirri and antennae with apparently smooth articles (light microscope) (Fig. 28A), but under SEM with small longitudinal crests (Figs 24F, 29A–C,F). Dorsal cirri short, inserted on distinct, strongly papillated cirrophores; dorsal cirri of 2–3 anteriormost segments longer than subsequent ones, with 12–9 articles; remaining dorsal cirri longer than parapodial lobes, with 5–6 articles; usually with distal article of cirri and antennae longer than others (Fig. 29F). Parapodia elongated with pointed tips (Fig. 29F), posteriorly slender (Fig. 30A). Ventral cirri triangular, elongated, inserted distally on parapodia. Compound chaetae numerous, heterogomph, bidentate falcigers, with proximal tooth smaller than distal one, and short, fine marginal spines (Figs 28C, 30B–D), ventralmost chaetae with shorter spines, straight, 12–14 chaetae on midbody; dorsoventral gradation in length, from about 25 µm dorsally, 17 µm ventrally. Aciculae

### Key to Australian species of *Xenosyllis*

- 1 Body flattened, with numerous longitudinal crests (more than 30 on midbody segments). Antennae and dorsal cirri apparently without longitudinal crests (but visible under the SEM). Palps not visible dorsally. Chaetae within a fascicle with distinct dorsoventral gradation in length of blades ..... *X. moloch* n.sp.
- Body flattened, with fewer longitudinal crests on dorsum (less than 30 on midbody segments). Antennae and dorsal cirri with distinct longitudinal crests. Palps dorsally visible. Chaetae within a fascicle with blades of similar length ..... *X. scabroides* n.sp.



solitary, thick, protruding from parapodial lobes (Figs 29F, 30A, arrows), slightly oblique at tip especially in posterior parapodia, (Fig. 28D). Capillary dorsal and ventral simple chaetae absent. Pharynx slender, unarmed. Proventricle almost spherical, through 4–5 segments, with about 15 muscle cell rows. Pygidium small, slightly bilobed, with 2 short anal cirri.

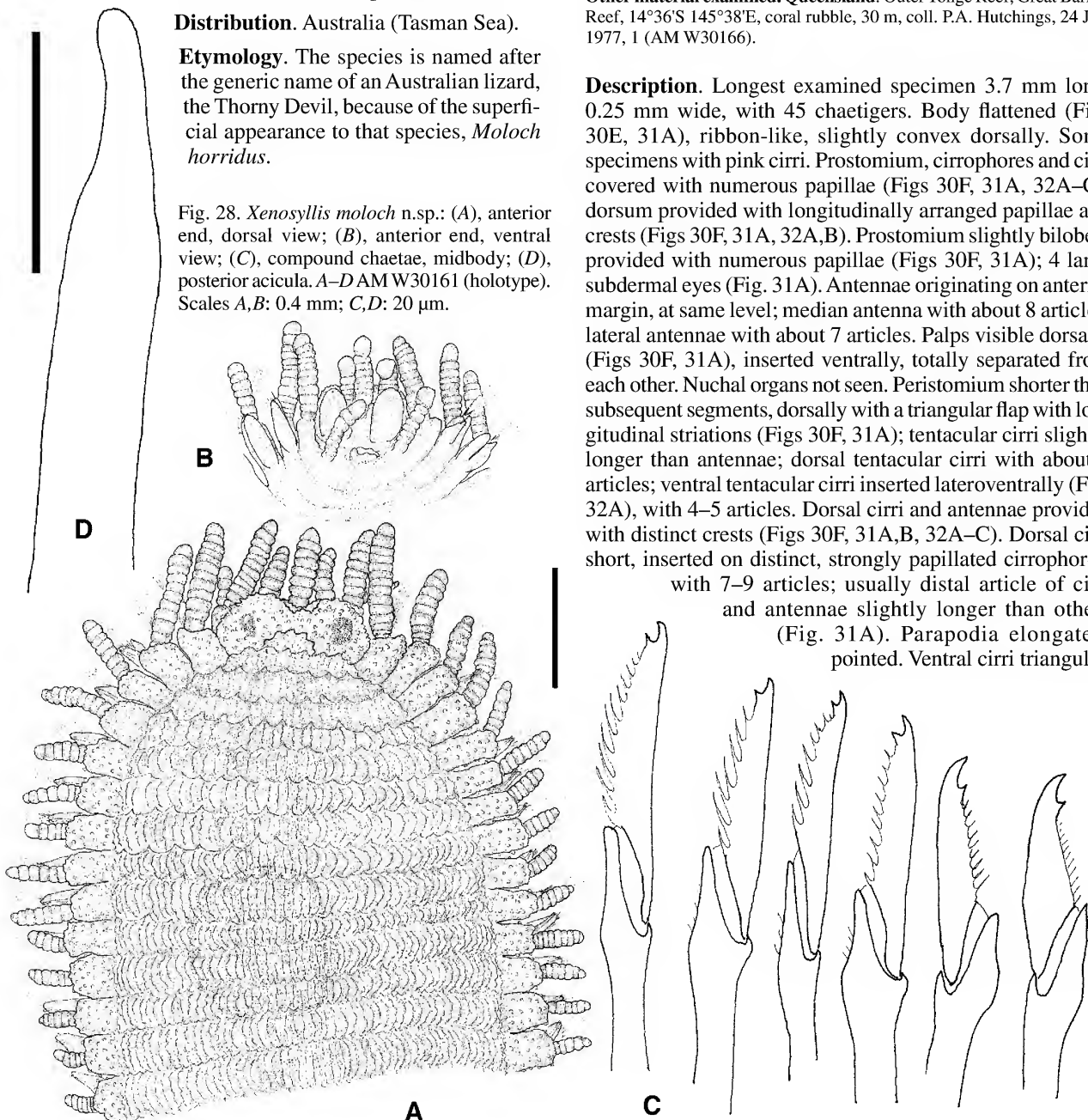
**Remarks.** *Xenosyllis moloch* differs from *Xenosyllis scabra* by having a broader body, with conspicuous longitudinal dorsal crests and anterior spines each with a distal pore on each segment, palps more ventrally placed, antennae and dorsal cirri without distinct longitudinal crests, and all compound chaetae bidentate; in contrast *X. scabra* has a much more slender body, segments with fewer crests, none of which end in spines; palps visible dorsally, antennae and dorsal cirri have distinct longitudinal crests, and ventralmost compound chaetae with unidentate blades.

**Habitat.** Occurs at depths of 244 m.

**Distribution.** Australia (Tasman Sea).

**Etymology.** The species is named after the generic name of an Australian lizard, the Thorny Devil, because of the superficial appearance to that species, *Moloch horridus*.

Fig. 28. *Xenosyllis moloch* n.sp.: (A), anterior end, dorsal view; (B), anterior end, ventral view; (C), compound chaetae, midbody; (D), posterior acicula. A–D AM W30161 (holotype). Scales A,B: 0.4 mm; C,D: 20  $\mu$ m.



### *Xenosyllis scabroides* n.sp.

Figs 30E,F, 31A–E, 32A–F, 33A,B

**Material examined.** HOLOTYPE (AM W30161) Western Australia: Goss Passage, Beacon Is., 28°25'30"S 113°47'E, dead plates of *Acropora* sp., covered in coralline algae, 8 m coll. P.A. Hutchings, 19 May 1994. PARATYPES: Western Australia: Kimberley regions Lafontaine Is., 14°10'S 125°47'E, muddy substrate with isolated coral rubble & sponges, 9–15 m, coll. P.A. Hutchings, 19 July 1988, 2 (AM W30162). Houtman Abrohlos: NE entrance to Goss Passage, Beacon Is., 28°27'54"S 113°46'42"E, dead branching staghorn *Acropora* sp., coralline & brown algae, 24 m, coll. P.A. Hutchings, 25 May 1994, 1 (AM W30163). SE end of Long Is., Goss Passage, 28°28'48"S 113°46'30"E, dead coral embedded in calcareous substrate, 30 m, coll. P.A. Hutchings, 22 May 1994, 4 (AM W30164). N end of Long Is., Goss Passage, 28°28'18"S 113°46'18"E, dead coral substrate, coralline algae & boring bivalves, 8 m, coll. C. Bryce, 22 May 1994, 1 (AM W30165). Goss Passage, Beacon Is., 28°25'30"S 113°47'E, dead plates of *Acropora* sp., covered in coralline algae, 8 m, coll. P.A. Hutchings, 22 May 1994, 2 (on SEM stub), (AM W30167).

**Other material examined.** Queensland: Outer Yonge Reef, Great Barrier Reef, 14°36'S 145°38'E, coral rubble, 30 m, coll. P.A. Hutchings, 24 Jan. 1977, 1 (AM W30166).

**Description.** Longest examined specimen 3.7 mm long, 0.25 mm wide, with 45 chaetigers. Body flattened (Figs 30E, 31A), ribbon-like, slightly convex dorsally. Some specimens with pink cirri. Prostomium, cirrophores and cirri covered with numerous papillae (Figs 30F, 31A, 32A–C); dorsum provided with longitudinally arranged papillae and crests (Figs 30F, 31A, 32A,B). Prostomium slightly bilobed, provided with numerous papillae (Figs 30F, 31A); 4 large subdermal eyes (Fig. 31A). Antennae originating on anterior margin, at same level; median antenna with about 8 articles; lateral antennae with about 7 articles. Palps visible dorsally (Figs 30F, 31A), inserted ventrally, totally separated from each other. Nuchal organs not seen. Peristomium shorter than subsequent segments, dorsally with a triangular flap with longitudinal striations (Figs 30F, 31A); tentacular cirri slightly longer than antennae; dorsal tentacular cirri with about 7 articles; ventral tentacular cirri inserted lateroventrally (Fig. 32A), with 4–5 articles. Dorsal cirri and antennae provided with distinct crests (Figs 30F, 31A,B, 32A–C). Dorsal cirri short, inserted on distinct, strongly papillated cirrophores, with 7–9 articles; usually distal article of cirri and antennae slightly longer than others (Fig. 31A). Parapodia elongated, pointed. Ventral cirri triangular,



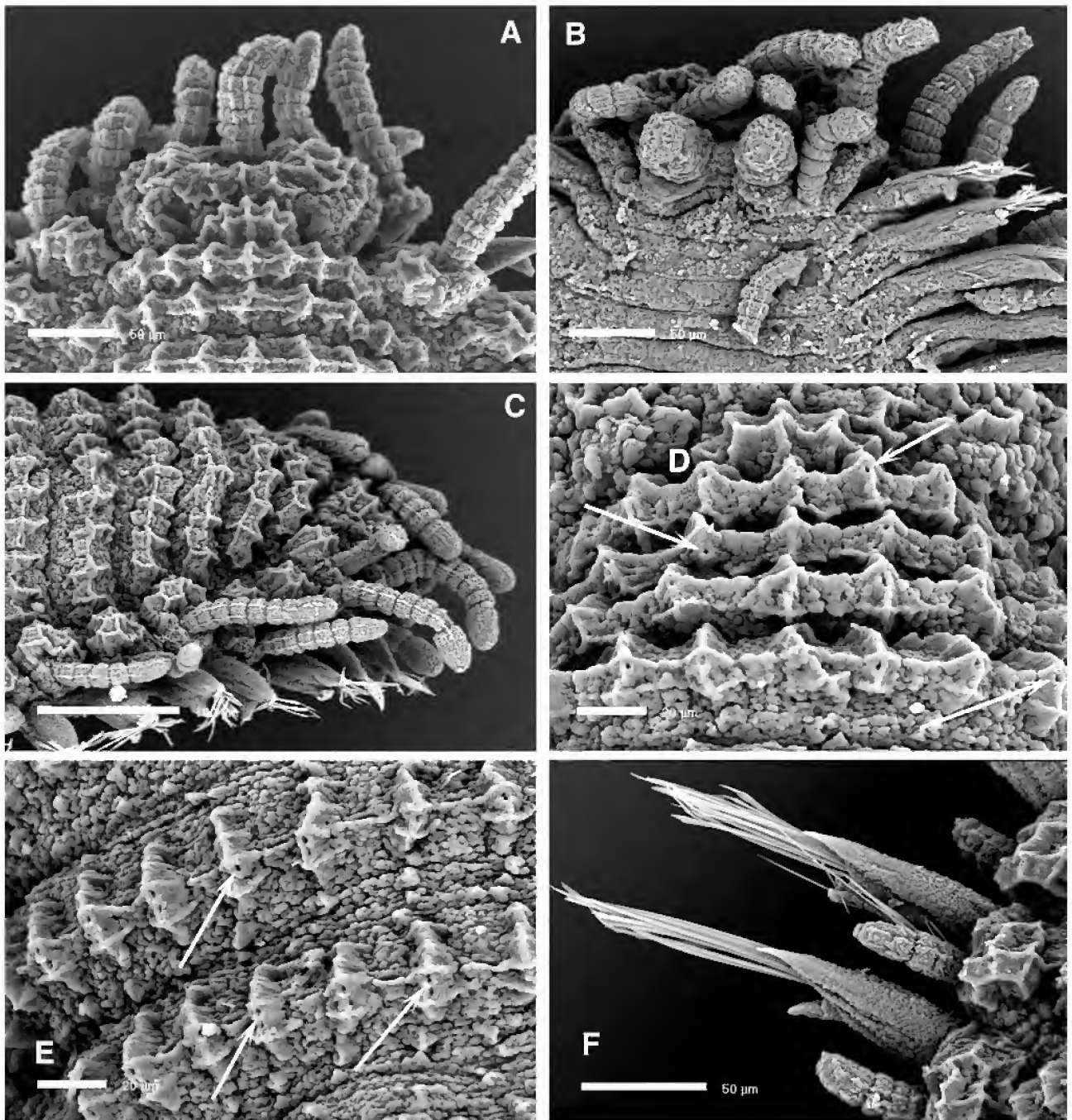


Fig. 29. SEM of *Xenosyllis moloch* n.sp.: (A), prostomium and anterior segments, dorsal view; (B), anterior end, ventral view; (C), anterior end, lateral view; (D), dorsum, with pores, anterior; (E), same, midbody; (F), midbody parapodia. A–F: AM W30160.

elongated, inserted near distal part of ventral cirri. Compound chaetae numerous, all heterogomph, bidentate falcigers, with proximal tooth smaller than distal one, and short, fine marginal spines, larger spines on superior chaetae (Figs 31C, 32D), middle and ventralmost chaetae bidentate and smooth (Figs 31C, 32E, 33A), numbering about 18 on midbody, and 8–10 posteriorly (Fig. 32F); dorsoventral gradation in length of appendages, from about 13 µm dorsally to 10 µm ventrally. Aciculae solitary, thick, sub-distally enlarged (Fig. 31E), protruding from parapodial lobes, especially on posterior parapodia, tip slightly oblique (Fig. 28D). Capillary dorsal simple chaetae absent; ventral simple chaetae slender, smooth, sigmoid, and bidentate (Figs 31D, 32F, 33A,B). Pharynx

slender in proportion to body width, unarmed (Fig. 31A), through about 6–7 segments. Proventricle almost spherical, through 2–3 segments, with about 17 muscle cell rows. Pygidium small (in proportion to pygidia present in other syllids), slightly bilobed, with 2 short anal cirri (Fig. 32B).

**Remarks.** *Xenosyllis scabroides* n.sp., is very similar to *Xenosyllis scabra* (Ehlers, 1864), it differs mainly in having all chaetae bidentate, whereas *X. scabra* also has unidentate, hooked compound chaetae in posterior parapodia (see San Martín, 2003, figs 167H, 168H). Campoy (1982) described *X. scabra* from different areas of the Iberian Peninsula and he commented that there were differences among specimens



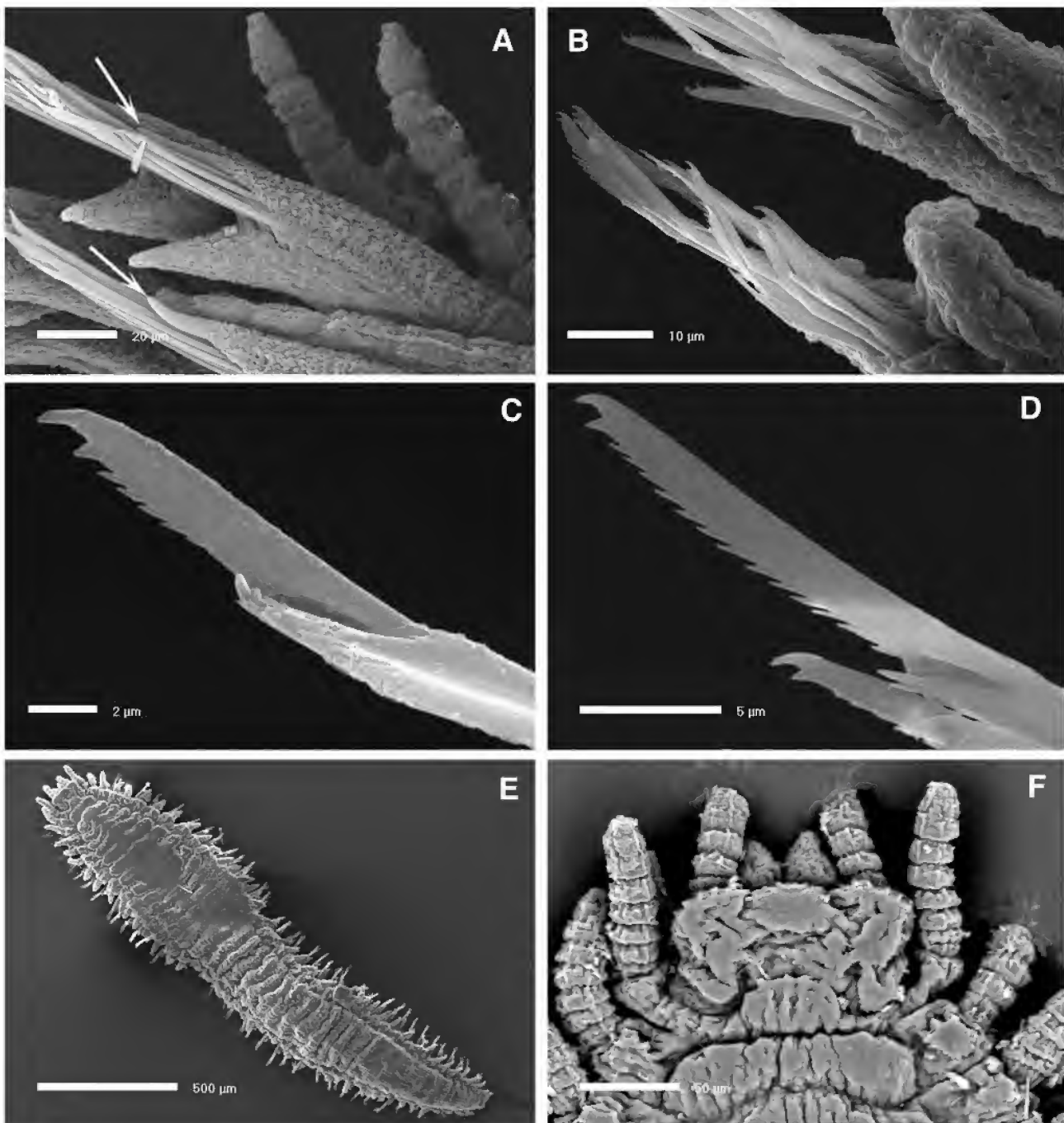


Fig. 30. SEM of *Xenosyllis moloch* n.sp.: (A) posterior parapodia; (B), midbody chaetal fascicle; (C), middle chaeta; (D), superior and inferior chaetae. SEM of *Xenosyllis scabroides* n.sp.: (E), complete specimen, dorsal view; (F), anterior end, dorsal view. A–D: AM W30160; E–F: AM W30167.

from different samples, some of them having all compound chaetae bidentate and others having the ventralmost ones unidentate, suggesting the possibility that several species were involved. All Australian specimens have bidentate compound chaetae bidentate only, with none corresponding to the typical *X. scabra* from European seas, so we consider that the Australian specimens belong to a new species. Reports of *X. scabra* from beyond the type locality should be examined as they may represent other species of the genus. *Xenosyllis scabroides* differs from *X. moloch* in the development of longitudinal crests on the antennae and dorsal cirri, and the number of these crests on mid body segments, with *X.*

*moloch* having more than 30 present whereas *X. scabroides* has less than 30 present. In addition *X. scabroides* occurs in 8–30 m and *X. moloch* in depths of 244 m.

**Habitat.** Occurs in shallow water associated with coral rubble.

**Distribution.** Australia (North and Central Western Australia, Queensland).

**Etymology.** The species is named *scabroides* because of its similarity to the type species of the genus, *Xenosyllis scabra*.

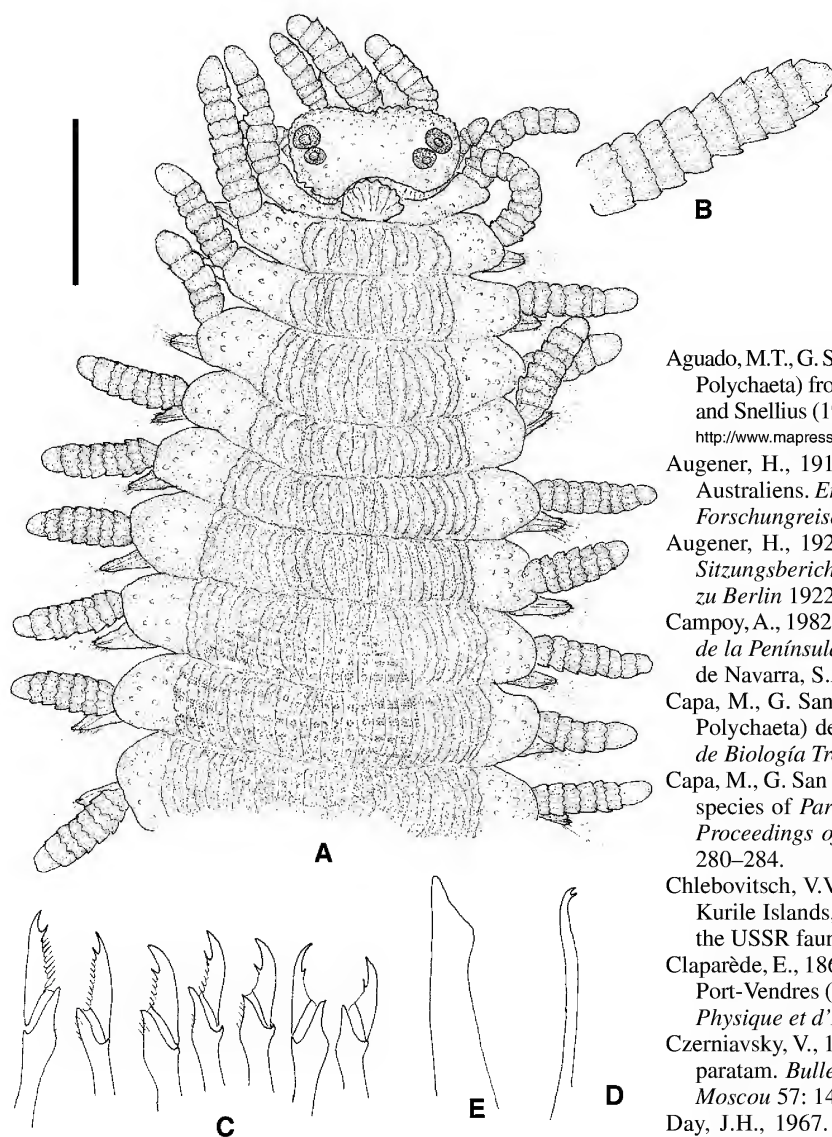


Fig. 31. *Xenosyllis scabroides* n.sp.: (A), anterior end, dorsal view; (B), dorsal cirrus; (C), midbody compound chaetae; (E), posterior acicula; (D), ventral simple chaeta. A–D: AM W30167 (paratype). Scales A: 0.18 mm; B: 92  $\mu$ m; C–E: 20  $\mu$ m.

## References

**ACKNOWLEDGMENTS.** This paper is a contribution of the project *Taxonomía y Sistemática de la Familia Syllidae (Polychaeta)*, funded by the *Ministerio de Educación y Ciencia* of the Spanish Government, Project number CGL2005-02442.

This project was partially financed also by the European Commission's Research Infrastructure Action via the SYNTHESIS Project.

We are grateful to Kate Attwood and Anna Murray, who did the rough sorting of the material, previously only identified to family level, and extracted the specimens of the subfamily Syllinae, and, together with Keyne Monro, managed the collection and checked the *Material examined* sections for us. We also appreciate the previous work mostly done by volunteers, of extracting syllids from benthic samples. Dr Angelika Brandt and Gisella Wegener, Zoologisches Museum of Hamburg (Germany) kindly and efficiently assisted the senior author during his stay at the Museum, which was necessary to examine type specimens to compare them with Australian material. We would also like to thank the curator of the MNHN (Tarik Meziane) and the curator of the ZMBN (Birger Neuhaus) for loaning us several type series. Finally we also want to express our gratitude to Yolanda Lucas, who drew figures 7, 14, and 18 and Dr Esperanza Salvador (SIDI of the UAM), for her assistance with the SEMs. Fig. 21 has been reproduced with the kind permission of Springer Science and Business Media. The comments and suggestions of two anonymous referees greatly improved the quality of the manuscript.

- Aguado, M.T., G. San Martín & H. Ten Hove, 2008. Syllidae (Annelida: Polychaeta) from Indonesia collected by the Siboga (1899–1900) and Snellius (1984) expeditions. *Zootaxa* 1673: 1–48. <http://www.mapress.com/zootaxa/2008/2/z101673p048.pdf>
- Augener, H., 1913. Polychaeta I, Errantia. Die Fauna Südwest-Australiens. *Ergebnisse des Hamburger Südwest-australischen Forschungsreise* 1905, 4(5): 65–304.
- Augener, H., 1922. Ueber litorale Polychaeten von Westindien. *Sitzungsberichte der Gesellschaft Naturforschender Freunde zu Berlin* 1922: 38–53.
- Campoy, A., 1982. *Fauna de España. Fauna de Anélidos Poliquetos de la Península Ibérica*. EUNSA (Ediciones de la Universidad de Navarra, S.A.), serie biológica. Pamplona, 781 pp.
- Capa, M., G. San Martín & E. López, 2001a. Syllinae (Syllidae: Polychaeta) del Parque Nacional de Coiba (Panamá). *Revista de Biología Tropical* 49(1): 103–115.
- Capa, M., G. San Martín & E. López, 2001b. Description of a new species of *Parasphaerosyllis* (Polychaeta: Syllidae: Syllinae). *Proceedings of the Biological Society of Washington* 114(1): 280–284.
- Chlebovitch, V.V., 1959. Species of polychaete worms from the Kurile Islands, which are new or recorded for the first time in the USSR fauna. *Zoologiceskij Zhurnal* 38: 167–181.
- Claparède, E., 1864. Glanure Zootomiques parmi les Annelides de Port-Vendres (Pyrenées Orientales). *Mémoires de la Société de Physique et d'Histoire Naturelle de Genève* 17(2): 463–600.
- Czerniavsky, V., 1882. Materialia ad zoographiam Ponticam comparatam. *Bulletin de la Société Impériale des Naturalistes de Moscou* 57: 146–198 (in Russian).
- Day, J.H., 1967. *A monograph on the Polychaeta of Southern Africa*, vol. 29. London: Trustees of the British Museum (Natural History), 878 pp.
- Day, J.H., 1975. On a collection of Polychaeta from intertidal and shallow reefs near Perth, Western Australia. *Records of the Western Australian Museum* 3(3): 167–208.
- Day, J.H., & P.A. Hutchings, 1979. An Annotated Check-list of Australian and New Zealand Polychaeta, Archiannelida and Myzostomida. *Records of the Australian Museum* 32(3): 80–161. <http://dx.doi.org/10.3853/j.0067-1975.32.1979.203> [Active from January 2009]
- Ehlers, E., 1864. *Die Borstenwürmer (Annelida Chaetopoda) nach Systematischen und Anatomischen Untersuchungen*. Leipzig: Wilhelm Engelmann, 270 pp.
- Ehlers, E., 1887. Report on the annelids of the dredging expedition of the U.S. coast survey steamer "Blake". *Memoires of the Museum of Comparative Zoology at Harvard College* 15: 1–335.
- Endacott, S.J., 1973. *Australian Aboriginal Words and Place Names*, 10th ed. Victoria: Acacia Press, 64 pp.
- Fauchald, K., 1977. The Polychaete Worms. Definitions and Keys to the Orders, Families, and Genera. *Natural History Museum of Los Angeles County. Science Series* 28: 1–188.
- Fauvel, P., 1923. *Faune de France 5. Polychètes Errantes*, ed. Le Chevalier. Paris, 486 pp.
- Fauvel, P., 1939. Annelides Polychètes de l'Indochine recueillies par M.C. Dawydoff. *Commentationes Pontificia Academia Scientiarum* 3(10): 243–360.
- Fauvel, P., 1950. Contribution à la faune des Annelides Polychètes du Senegal. *Bulletin de l'Institut française de l'Afrique noire* 12(2): 335–394.



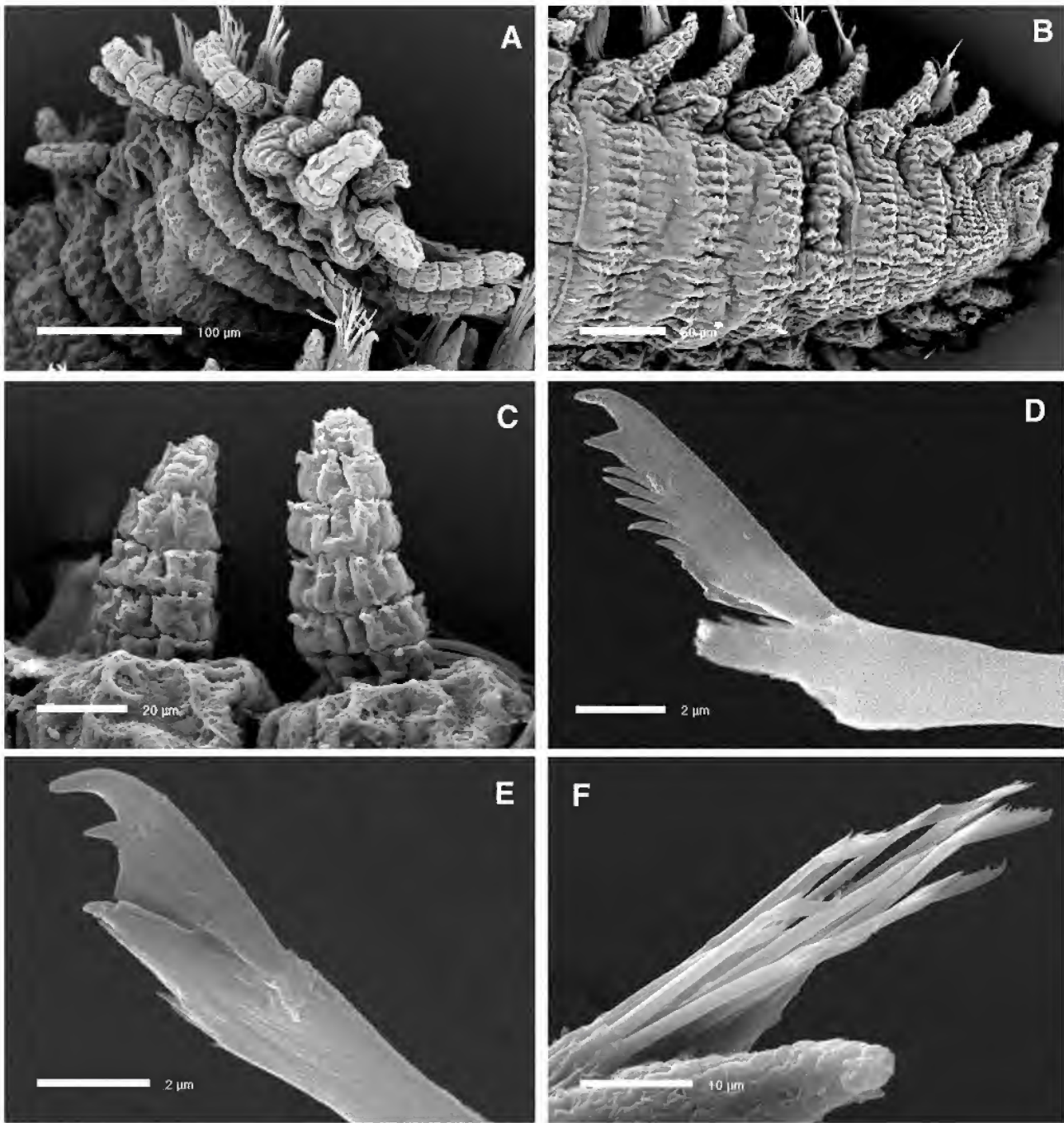


Fig. 32. SEM of *Xenosyllis scabroides* n.sp.: (A), detail of anterior end; (B), posterior end, dorsal view; (C), midbody dorsal cirri; (D), superior compound chaetae; (E), middle compound chaetae; (F), posterior chaetal fascicle. A–F: AM W30167 (paratype).

Fauvel, P., & F. Rullier, 1959. Contribution à la faune des Annélides Polychètes du Sénégal et de la Mauretanie (Première Partie). *Bulletin de l'Institut française de l'Afrique noire, sér. A:* 477–533.  
 Franke, H.D., 1999. Reproduction of the Syllidae (Annelida: Polychaeta). *Hydrobiologia* 402: 39–55.  
<http://dx.doi.org/10.1023/A:1003732307286>  
 Garwood, P., 1991. Reproduction and the Classification of the Family Syllidae (Polychaeta). *Ophelia* supplement 5: 81–87.  
 Gidholm, L., 1962. Sur quelques polychètes syllidiens des sables de la région de Roscoff avec la description de deux nouvelles espèces. *Cahiers de Biologie Marine* 3: 249–260.  
 Glasby, C.J., 2000. Family Syllidae. In *Polychaetes & Allies: The Southern Synthesis. Fauna of Australia. Vol. 4A Polychaeta,*

*Myzostomida, Pogonophora, Echiura, Sipuncula*, ed. P.L. Beesley, G.J.B. Ross and C.J. Glasby, pp. 161–167. Melbourne: CSIRO Publishing, xii+465 pp.  
 Glasby, C.J., & C. Watson, 2001. A new genus and species of Syllidae (Annelida: Polychaeta) commensal with Octocorals. *The Beagle, Records of the Museum and Art Galleries of the Northern Territory* 17: 43–51.  
 Gravier, C., 1900. Contribution à l'étude des Annélides Polychètes de la Mer Rouge. *Nouvelles Archives du Muséum d'Histoire Naturelle*, ser. 4, 2: 137–282.  
 Grube, A.E., 1850. Die Familien der Anneliden. *Archiv für Naturgeschichte* 16: 249–364.  
 Grube, A.E., 1857. *Annulata Örstediana. Eumeratio Annulorum, quae in itinere per Indian occidentalem et Americam centalem*

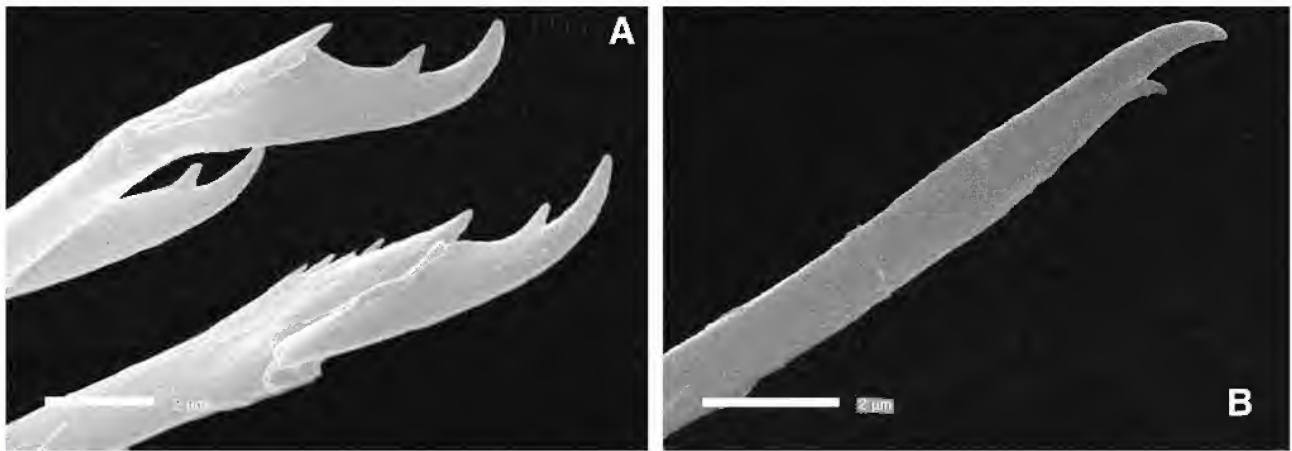


Fig. 33. SEM of *Xenosyllis scabroides* n.sp.: (A) inferior compound and ventral simple chaetae, posterior parapodium; (B), ventral simple chaeta, posterior parapodium. A–B: AM W30167 (paratype).

- annis 1845–1848 suscepto Iwgit cl. A.S. Örsted, adjectis speciebus nonnullis a cl. H. Krøyer in itinere ad Americam meridionalis collectis. *Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening i København* 1857: 158–186.
- Harlock, R., & L. Laubier, 1966. Notes on *Branchiosyllis uncinigera* (Hartmann-Schröder, 1960), new to the Mediterranean. *Israel Journal of Zoology* 15: 18–25.
- Hartman, O., 1954. Marine Annelids from the Northern Marshall Islands, Bikini and nearby atolls, Marshall Islands. *Professional Papers U.S. Geological Survey* 260: 615–644.
- Hartman, O., 1959. Catalogue of the polychaetous annelids of the world. Parts I, II (1959), and Supplement (1965). *Allan Hancock Foundation Occasional Papers* 23: 1–828.
- Hartmann-Schröder, G., 1956. Polychaeten-Studien. I. *Zoologischer Anzeiger* 157: 87–91.
- Hartmann-Schröder, G., 1959. Zur ökologie der Polychaeten des Mangrove-Estero-Gebietes von El Salvador. *Beiträge der neotropischen Fauna* 1: 70–183.
- Hartmann-Schröder, G., 1960. Polychaeten aus dem Roten Meer. *Kieler Meeresforschungen* 16: 69–125.
- Hartmann-Schröder, G., 1965. Zur Kenntnis der eulitoral Polychaetenfauna von Hawaii, Palmyra und Samoa. *Abhandlungen und Verhandlungen des Naturwissenschaftlichen Vereins in Hamburg* 9: 81–161.
- Hartmann-Schröder, G., 1979. Teil 2. Die Polychaeten der tropischen Nordwestküste Australiens (zwischen Port Samson im Norden und Port Hedland in Süden). *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Institut* 76: 75–218.
- Hartmann-Schröder, G., 1980. Teil 4. Die Polychaeten der tropischen Nordwestküste Australiens (zwischen Port Samson im Norden und Exmouth im Süden). *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Institut* 77: 41–110.
- Hartmann-Schröder, G., 1981. Teil 6. Die Polychaeten der tropisch-subtropischen Westküste Australiens (zwischen Exmouth im Norden und Cervantes im Süden). *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Institut* 78: 19–96.
- Hartmann-Schröder, G., 1982. Teil 8. Die Polychaeten der subtropischen-antiborealen Westküste Australiens (zwischen Cervantes im Norden und Cape Naturaliste im Süden). *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Institut* 79: 51–118.
- Hartmann-Schröder, G., 1983. Teil 9. Die Polychaeten der antiborealen Südwestküste Australiens (zwischen Dunsborough im Norden und Denmark im Süden). *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Institut* 80: 123–167.
- Hartmann-Schröder, G., 1984. Teil 10. Die Polychaeten der antitiborealen Südküste Australiens (zwischen Albany im Westen und Ceduna im Osten). *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Institut* 81: 7–62.
- Hartmann-Schröder, G., 1985. Teil 11. Die Polychaeten der antiborealen Südküste Australiens (zwischen Port Lincoln im Westen und Port Augusta im Osten). *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Institut* 82: 61–99.
- Hartmann-Schröder, G., 1986. Teil 12. Die Polychaeten der antiborealen Südküste Australiens (zwischen Wallaroo im Westen und Port MacDonnell im Osten). *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Institut* 83: 31–70.
- Hartmann-Schröder, G., 1987. Teil 13. Die Polychaeten der antiborealen Küste von Victoria (Australien) (zwischen Warrnambool im Westen und Port Welshpool im Osten). *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Institut* 84: 27–66.
- Hartmann-Schröder, G., 1989. Teil 14. Die Polychaeten der antiborealen und subtropisch-tropischen Küste Südost-Australien zwischen Lakes Entrance (Victoria) im Süden und Maclean (New South Wales) im Norden. *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Institut* 86: 11–63.
- Hartmann-Schröder, G., 1990. Teil 15. Die Polychaeten der subtropisch-tropischen und tropischen Ostküste Australiens zwischen Lake Macquarie (New South Wales) im Süden und Gladstone (Queensland) im Norden. *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Institut* 87: 41–87.
- Hartmann-Schröder, G., 1991. Teil 16. Die Polychaeten der subtropisch-tropischen bis tropischen Ostküste Australiens zwischen Maclean (New South Wales) und Gladstone (Queensland) sowie von Heron Is (Grosses Barriere-Riff). *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Institut* 88: 17–71.
- Haswell, W.A., 1886. Observations on some Australian Polychaeta. *Proceedings of the Linnean Society of New South Wales* 10: 733–756.
- Imajima, M., 1966. The Syllidae (Polychaetous Annelids) from Japan. (V). Syllinae (2). *Publications of Seto Marine Biological Laboratory* 14(4): 253–294.
- Imajima, M., 2003. Polychaetous Annelids from Sagami Bay and Sagami Sea Collected by the Emperor Showa of Japan and Deposited at the Showa Memorial Institute, National Science Museum, Tokyo (II). Orders included within the Phyllococida, Amphinomida, Spintherida and Eunicida. *National Science Museum Monographs* 23: 1–221.
- Imajima, M., & O. Hartman, 1964. *The Polychaetous Annelids of Japan. Part I*. Allan Hancock Foundation Publication Occasional Paper 26, 237 pp.
- Kirkegaard, J.B., 1995. Bathyal and Abyssal Polychaetes (Errant species). *Galathea Report, Scientific Results of the Danish Deep-Sea Expedition Round the World 1950–52*: 1–56.



- Krohn, A., 1852. Ueber die Erscheinungen bei der Fortpflanzung von *Syllis prolifera* und *Autolytus prolifer*. *Archiv für Naturgeschichte* 18: 66–76.
- Kudenov, J., & L. Harris, 1995. Family Syllidae Grube, 1850. In: *Taxonomic Atlas of Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel*, ed. J. Blake, B. Hilbig & P.H. Scott. Santa Bárbara, California: Santa Barbara Museum of Natural History, pp. 1–97.
- Lamarck, J.B. de, 1818. *Histoire Naturelle des animaux sans vertèbres, présentant les caracteres généraux et particuliers de ces animaux, leur distribution, leurs classes, leurs familles, leurs genres, et la citation des principales especes qui s'y rapportent; precedes d'une Introduction offrant la détermination des caracteres essentiels de l'Animal, sa distinction du vegetal et des autres corps naturelles, enfin l'Exposition des Principes fondamentaux de la Zoologie*. Deterville, Paris, tom. 5, 612 pp.
- Langerhans, P., 1879. Die Würmfauna von Madeira. *Zeitschrift für Wissenschaftliche Zoologie* 33: 267–316.
- Langerhans, P., 1881. Ueber einige canarische Anneliden. *Nova Acta Academiae Leopoldino-Carolinae Germanicae Naturae Curiosorum* 42: 93–124.
- Laubier, L., 1967. Annelides Polychètes interstitielles de Nouvelle-Calédonie. *Expédition Française sur les récifs coralliens de la Nouvelle-Calédonie organisée sous l'égide de la Fondation Singer-Polignac* 1960–1963: 91–101.
- Laubier, L., 1968. Le coralligène de l'Albères. Monographie biocénotique. *Annales de l'Institut Océanographique* 43(2): 137–316.
- Licher, F., 1999. Revision of Gattung *Typosyllis* Langerhans, 1879 (Polychaeta: Syllidae). Morphologie, Taxonomie und Phylogenie. *Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft* 551: 1–336.
- Malaquin, A., 1893. Recherches sur les syllidiens. *Mémoires de la Société des Sciences, de l'Agriculture et des Arts de Lille* 18: 1–447.
- Malmgren, A.J., 1867. Annulata Polychaeta Spetsbergiae Groenlandiae, Islandiae et Scandinaviae hactenus cognita. *Ofversigt af Svenska Vetenskaps Akademiens Förhandlingar* 24: 1–127.
- Marion, A.F., & N. Bobretzky, 1875. Étude des Annelides du Golfe de Marseille. *Annales des Sciences Naturelles* 2: 2–46.
- Michel, A., 1909. Sur les divers types de stolons chez les Syllidiens, spécialement sur une nouvelle espèce (*Syllis cirropunctata* n.sp.) à stolon acéphale, et sur la réobservation du stolon tétracère de *Syllis amica* Quatrefage. *Comptes Rendues de l'Académie des Sciences* 148: 318–320.
- Monro, C.C.A., 1933. The Polychaeta Errantia collected by Dr. C. Crossland at Colón, in the Panama Region, and the Galapagos Island during the Expedition of the S.Y. "St. George". *Proceedings of the Zoological Society of London* 1: 1–96.
- Monro, C.C.A., 1937. Polychaeta. The John Murray Expedition 1933–34. *British Museum (Natural History), Scientific Reports* 4(8): 32–321.
- Monro, C.C.A., 1939. On some tropical Polychaeta in the British Museum, mostly collected by Dr. C. Crossland at Zanzibar, Tahiti and the Marquesas (II. Families Syllidae and Hesionidae). *Novitates Zoologicae* 41: 383–393.
- Örsted, A.E., 1845. Ueber die Entwicklung der Jungen bei einer Annelide und über änderen Unterschieden zwischen beiden Geschlechtern. *Archiv für Naturgeschichte Berlin* 11(1): 20–23.
- Perkins, T.H., 1981. Syllidae (Polychaeta), principally from Florida, with descriptions of a new genus and twenty-one new species. *Proceedings of the Biological Society of Washington* 93(4): 1080–1172.
- Rioja, E., 1941. Estudios anelidológicos. III. Datos para el conocimiento de la fauna de Poliquetos de las costas del Pacífico de México. *Anales del Instituto de Biología de la Universidad de México* 12: 669–740.
- Rioja, E., 1958. Estudios anelidológicos. XXII. Datos para el conocimiento de la fauna de anélidos poliquetos de las costas orientales de México. *Anales del Instituto de Biología de la Universidad de México* 29: 219–301.
- Rullier, F., 1972. Annelides Polychètes de Nouvelle-Calédonie recueillies par Y. Plessis et B. Salvat. Expédition Française sur les récifs coralliens de la Nouvelle-Calédonie. *Editions de la Fondation Singer-Polignac* 6: 1–169.
- San Martín, G., 1984. *Estudio biogeográfico, faunístico y sistemático de los Poliquetos de la familia Sílidos (Syllidae: Polychaeta) en Baleares*. Ediciones de la Universidad Complutense de Madrid 187: 529 pp.
- San Martín, G., 1991. Syllinae (Polychaeta: Syllidae) from Cuba and the Gulf of México. *Bulletin of Marine Science* 48(2): 236–241.
- San Martín, G., 1992. *Syllis* Savigny in Lamarck, 1818 (Syllinae: Syllidae: Polychaeta) from Cuba, the Gulf of México, Florida and North Carolina, with a revision of several species described by Verrill. *Bulletin of Marine Science* 51(3): 407–419.
- San Martín, G., 2002. A new genus and species of Syllidae (Polychaeta) from Australia brooding eggs dorsally by means of compound notochaetae. *Proceedings of the Biological Society of Washington* 115(2): 333–340.
- San Martín, G., 2003. Annelida Polychaeta II: Syllidae. In: *Fauna Ibérica*, vol. 21, ed. M.A. Ramos *et al.* Madrid, Spain: Museo Nacional de Ciencias Naturales, CSIC, 554 pp.
- San Martín, G., 2005. Exogoninae (Polychaeta, Syllidae) from Australia, with the description of a new genus and twenty two new species. *Records of the Australian Museum* 57(1): 39–152.  
<http://dx.doi.org/10.3853/j.0067-1975.57.2005.1438>
- San Martín, G., & D. Bone, 1999. Two new species of *Dentatisyllis* and *Branchiosyllis* (Polychaeta: Syllidae: Syllinae) from Venezuela. *Proceedings of the Biological Society of Washington* 112: 319–326.
- San Martín, G., & E. López, 2003. A new genus of Syllidae (Polychaeta) from Western Australia. *Hydrobiologia* 496: 191–197.  
<http://dx.doi.org/10.1023/A:1026140714187>
- San Martín, G., & P.A. Hutchings, 2006. Eusyllinae (Polychaeta, Syllidae) from Australia with the description of a new genus and fifteen new species. *Records of the Australian Museum* 58(3): 257–370.  
<http://dx.doi.org/10.3853/j.0067-1975.58.2006.1466>
- San Martín, G., M. Aguado & A. Murray, 2007. A new genus and species of Syllidae (Polychaeta) from Australia with unusual morphological characters and uncertain systematic position. *Proceedings of the Biological Society of Washington* 120(1): 39–48.  
[http://dx.doi.org/10.2988/0006-324X\(2007\)120\[39:ANGASO\]2.0.CO;2](http://dx.doi.org/10.2988/0006-324X(2007)120[39:ANGASO]2.0.CO;2)
- Schmarda, L.K., 1861. *Neue wirbellose Thiere beobachtet und gesammelt auf einer Reise um die Erde 1853 bis 1857. I (Turbellarien, Rotatorien und Anneliden) (2)*. Leipzig: Wilhelm Engelmann, 164 pp.
- Uebelacker, J.M., 1984. Family Syllidae Grube, 1850. In: *Taxonomic guide to the polychaetes of the northern Gulf of Mexico*, vol. IV, ed. J.M. Uebelacker & P.G. Johnson. Mobile: Barry A. Vittor and Associates, pp. 1–151.
- Verrill, A.E., 1900. Additions to Turbellaria, Nemertina and Annelids of the Bermudas, with revisions of some New England genera and species. *Transactions of the Connecticut Academy of Arts and Sciences* 10: 595–670.
- Westheide, W., 1974. Interstitielle Fauna von Galapagos. XI. Pisionidae, Pilargidae, Syllidae. *Mikrofauna Meeresbodens* 44: 195–338.

Manuscript submitted 19 February 2007, revised 21 February 2008, and accepted 15 March 2008.

Associate Editor: G.D.F. Wilson.